ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

DEC 2 1 2015

Via Electronic Submittal System (CDX)

Mr. Jared Blumenfeld, Regional Administrator
U.S. Environmental Protection Agency, Region IX
Mail Code ORA-1
75 Hawthorne Street
San Francisco, CA 94105

Re: Submission of West Pinal PM_{10} Nonattainment Area SIP Revision

Dear Mr. Blumenfeld:

Consistent with the provisions of Arizona Revised Statutes §§ 49-104, 49-106, 49-404, 49-406 and 49-425 and the Code of Federal Regulations (CFR) Title 40, §§ 51.102 through 51.104, the Arizona Department of Environmental Quality (ADEQ) hereby adopts and submits to the U.S. Environmental Protection Agency (EPA) the "2015 West Pinal Moderate PM_{10} Nonattainment Area SIP" as a revision to the Arizona State Implementation Plan (SIP).

On May 31, 2012, EPA redesignated an area in western Pinal County, Arizona, from "unclassifiable" to "nonattainment" for the 1987 PM_{10} NAAQS.[1] The "West Pinal County PM_{10} Nonattainment Area" was classified as a "moderate area" under the Clean Air Act § 188. On December 30, 2013, ADEQ submitted a revision to the Arizona SIP to meet certain CAA obligations for PM_{10} nonattainment areas. ADEQ withdrew the plan from consideration for EPA action on February 19, 2014, in order to submit a SIP revision that met all required elements.

The SIP revision submitted today consists of a main document and several attached appendices both procedural and technical in nature (Appendix A through I). An email will also be sent to EPA Region 9 offices with a temporary link to allow for download of the SIP document and accompanying appendices.

ADEQ requests that EPA approve this revision to the Arizona SIP, including those final rules and statutes in Appendix G submitted for approval with the SIP document. These rules and statutes include Arizona's Agricultural Best Management Practices rules as they pertain to the Pinal Nonattainment Area, Pinal County's construction fugitive dust and general fugitive dust rules, and revised versions of Arizona Revised Statutes §§ 49-424 and 49-457.

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[1] *Redesignation of West Pinal County as Nonattainment for PM_{10}*, 77 Fed. Reg. 32024 (May 31, 2012) (codified at 40 CFR pt. 81.303).

I am submitting this SIP revision in my capacity as Director of the ADEQ Air Quality Division pursuant to the delegation of authority from Misael Cabrera, ADEQ Director.

If you have any questions about this submission, please contact me at (602) 771-2288.

Sincerely,

Eric C. Massey
Director, Air Quality Division

Encls. (1)

Cc: Colleen McKaughan, EPA Region IX

ADEQ
Arizona Department of Environmental Quality

2015 West Pinal Moderate PM10 Nonattainment Area SIP

Air Quality Division
December 21, 2015 Final

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1 EXECUTIVE SUMMARY

The West Pinal County PM_{10}[1] Nonattainment Area is in Central Arizona, located within a basin between the Phoenix and Tucson metropolitan areas. Pinal County as a whole encompasses 5,365.61[2] square miles and has two distinct regions: the eastern portion which is characterized by mountains with elevations up to 6,441 feet and the western region primarily comprised of low desert valleys and irrigated agriculture. Figure 1-1 illustrates the geographical location of Pinal County within the State of Arizona.

Figure 1-1 Pinal County at a Glance

Source: Pinal County Economic Development.[3]

[1] Particulate matter with a diameter of 10 microns or less
[2] United States Census Bureau, Pinal County, Arizona QuickFacts Beta, (June 29, 2015) http://quickfacts.census.gov/qfd/states/04/04021.html.
[3] Pinal County at Glance, http://www.pinalcountyaz.gov/ed/Pages/Home.aspx (last visited Jun. 29, 2015).

Effective July 2, 2012, the U.S. Environmental Protection Agency redesignated a portion of western Pinal County from "unclassifiable" to "nonattainment" area for the 1987 24-hour PM_{10} National Ambient Air Quality Standards (NAAQS).[4] The 24-hour PM_{10} standard was promulgated in 1987 to be 150 micrograms per cubic meter ($\mu g/m^3$), meaning that an air quality monitor cannot measure levels of PM_{10} greater than 150 micrograms per cubic meter (μ/m^3) more than once per year on average over a consecutive three-year period. [5]

The designation of the West Pinal County PM_{10} nonattainment area is based on recorded violations of the PM_{10} standard at various monitoring sites within the county. The boundaries of the nonattainment area encompass land that is located within Pinal County north of the east-west line, defined by the southern line of Township 9 South, Gila and Salt River Baseline and Meridian, and west of the north-south line, defined by the eastern line of Range 8 East, except for Indian Country, certain federal land, and where the boundary extends farther east in the Florence and Picacho Peak areas.[6]

This State Implementation Plan for the West Pinal County PM_{10} Nonattainment Area consists of the following additional six chapters:

Chapter 2 - COMPLETENESS CRITERIA (40 C.F.R. Part 51, Appendix V)– Notes the Appendix V requirements and their respective locations in the rules

Chapter 3 – INTRODUCTION– Provides an introduction to the physical, demographic, economic description of the area, as well as to the regulatory background of the PM_{10} NAAQS in Pinal County.

Chapter 4 – AMBIENT AIR QUALITY MONITORING– Describes how the Pinal County Ambient Monitoring Network meets the Clean Air Act and U.S. Environmental Protection Agency regulatory requirements.

Chapter 5 – ANNUAL EMISSIONS INVENTORY– Provides the base year emission inventory for the nonattainment area. It summarizes the methodologies used to develop the inventory as required by the Clean Air Act Section 172(c)(3) and to project it from the base year to the attainment year. Additionally, this section summarizes the development and quantification of the motor vehicle emissions budget (MVEB).

Chapter 6 – CONTROL MEASURES– Identifies significant sources of emissions within the West Pinal County Nonattainment Area and presents a summary and analyses of the control measures chosen to achieve attainment and reasonable further progress

[4] Redesignation of West Pinal County as Nonattainment for PM_{10}, 77 Fed. Reg. 32024 (May 31, 2012) (codified at 40 C.F.R. pt. 81.303).
[5] As calculated rounding to the nearest 10 $\mu g/m^3$, according to 40 C.F.R. § 50, Appendix K (2015) (effective 2006).
[6] Redesignation, *supra* note 4, at 32029.

(RFP). The section also summarizes the development and quantification of the emissions reductions needed to meet contingency measure goals.

Chapter 7 – ATTAINMENT DEMONSTRATION AND REASONABLE FURTHER PROGRESS– Presents a summary of the 2008 and 2018 base year modeling for selected design days and modeling domains. Summarizes the modeling methodology and results when incorporating additional controls to demonstrate attainment.

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2 COMPLETENESS CRITERIA (40 C.F.R. Part 51, Appendix V)

2.1 Administrative Materials

2.1.1 A formal letter of submittal from the Governor or his [her] designee, requesting EPA approval of the plan or revision thereof (hereafter "the plan").

See the cover letter for this SIP submission and attached delegation of authority from Misael Cabrera, Director of ADEQ, to Eric Massey, Director of the ADEQ Air Quality Division, authorizing Mr. Massey to perform any act the ADEQ Director is authorized to perform under the state air quality statutes, including the submission of SIPs to EPA.

2.1.2 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.

See cover letter to this document wherein the state adopts and submits this SIP revision. This is the method of Arizona state adoption. The rules were adopted into Arizona law once finalized and are effective January 1, 2016. See Appendix G for the certified rules. Additionally, Pinal County's Board of Supervisors adopted the construction and fugitive dust rules as law. See Appendix H and Appendix I for more information.

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

The Arizona Department of Environmental Quality has responsibility for air pollution control and abatement, and as such, is required to adopt and "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." A.R.S. § 49-404(A). ADEQ also maintains authority to issue and administer rules, adopt county rules, and to submit such rules for approval in the SIP. Copies of Arizona Revised Statutes sections 49-104, 49-106, 49-404, 49-406 and 49-425, are attached as Appendix E, Exhibit E-II.

2.1.4 A copy of the actual regulation, or document submitted for approval and incorporation by reference into the plan, including indication of the changes made to the existing approved plan, where applicable.

Appendix G includes the rules and statutes submitted for Approval into the SIP, as well as comparative redlines. Table 2-1 below lists the regulations being added and replaced by this SIP Revision. In order to promote maximum consistency between state and federal law ADEQ requests that EPA remove each of the rules or statutes identified in the third column of the table from the approved SIP.

Table 2-1 Rules and Statutes to Be Added to and Removed from the SIP

Rule or Statute Added	Overarching Arizona Administrative Register or Legislative Citation	SIP Rule(s) Replaced (Federal Register Citation)
A.R.S. § 49-424 (2015) Duties of department (revised high risk forecast mandate included)	A.R.S. § 49-424 as amended by Laws 2014, Ch. 86, § 1 (House Bill 2125)	A.R.S. § 49-424 (2011) Duties of department (77 FR 66398, Nov. 5, 2012)
A.R.S. § 49-457 (2015) Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions	A.R.S. § 49-457 (effective January 1, 2016) as amended by Laws 2015, Ch. 243, § 1 (House Bill 2394)	A.R.S. § 49-457 (1998) Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions (64 FR 34726, Jun. 29, 1999)

Rule or Statute Added	Overarching Arizona Administrative Register or Legislative Citation	SIP Rule(s) Replaced (Federal Register Citation)
A.A.C., Title 18, Chapter 2, Article 2. **Sections** R18-2-210. Ambient Air Quality Standards; Area Designations; Classifications **A.A.C. Title 18, Chapter 2, Article 6. Emissions from Existing and New Nonpoint Sources** **Sections** R18-2-610. Definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03 … R18-2-610.03. Agricultural PM General Permit for Crop Operations; Pinal County PM Nonattainment Area R18-2-611. Definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03 … R18-2-611.03. Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area R18-2-612. Definitions for Definitions for R18-2-612.01 R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; PM Nonattainment Areas Designated After June 1, 2009 … Appendix 2. Test Methods And Protocols (Other rules were included in this rulemaking, but ADEQ intends to submit them in a subsequent revision)	Notice of Final Exempt Rulemaking, 21 A.A.R. 1156, July 24, 2015 (effective July 2, 2015).	A.A.C. R18-2-210 (2012) Attainment, Nonattainment, and Unclassifiable Area Designations (79 FR 56655, Sept. 23, 2014) ADEQ is not requesting rule replacement of any of the A.A.C. Title 18, Chapter 2, Article 6 agricultural rules at this time. ADEQ is only requesting additions, currently. ADEQ will request any replacements in a subsequent SIP revision submittal.

Rule or Statute Added	Overarching Arizona Administrative Register or Legislative Citation	SIP Rule(s) Replaced (Federal Register Citation)
Pinal County Code of Regulations, Chapter 4, Article 3, Construction Sites – Fugitive Dust **Sections** § 4-3-160. General Provisions – West Pinal PM10 Nonattainment Area § 4-3-170. Definitions § 4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements § 4-3-190. Violations (§ 1-1-105. SIP List was also revised in this rulemaking but is not appropriate for inclusion in the SIP. ADEQ is not requesting approval for this section into the SIP.)	Notice of Final Rulemaking, 21 A.A.R. 2937, November 20, 2015 (effective January 1, 2016).	None
Pinal County Air Quality Control District Code of Regulations, Chapter 4, Article 1, West Pinal PM10 Moderate Nonattainment Area Fugitive Dust **Sections** § 4-1-010. General Applicability § 4-1-015. Exemptions § 4-1-020. Definitions § 4-1-030. Standards § 4-1-040. Recordkeeping § 4-1-045. Reporting Requirements § 4-1-050. Records Retention § 4-1-060. Violations (§ 1-1-105. SIP List was also revised in this rulemaking but is not appropriate for inclusion in the SIP. ADEQ is not requesting approval for this section into the SIP.)	Notice of Final Rulemaking, 21 A.A.R. 2925, November 20, 2015 (effective January 1, 2016).	None

2.1.5 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.

As demonstrated in Sections 2.1.2, 2.1.3 and 2.1.7 ADEQ has complied with all requirements of state law for adoption of the rule revisions included in this SIP Revision.

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

Proof that ADEQ gave notice of the SIP Revision in accordance with A.R.S. § 49-444 is attached as Appendix E, Exhibit E-III.

2.1.7 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.

The certification and other documents related to the public hearing are attached as Appendix E, Exhibits E-III through E-VIII.

2.1.8 Compilation of public comments and the State's response thereto.

A compilation of comments received and the State's responses are attached as Appendix E, Exhibit E-VII.

2.2 Technical Support

2.2.1 Identification of all regulated pollutants affected by the plan.

This plan includes provisions for the regulation of PM_{10} emissions. See Section *3.1, Statement of Introduction and Purpose* and *Chapter 6, Control Measures*.

2.2.2 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).

This nonattainment plan is applicable to sources within the West Pinal PM_{10} Nonattainment Area. See *Section 3.5.1* and *Chapter 5, Annual Emissions Inventory*.

2.2.3 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.

Calculated emissions reductions due to implementation of control strategies contained in this plan are provided in *Section 5.4 Comparison of Base Year Inventories to Control Inventories* and *Chapter 6, Control Measures*.

2.2.4 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 (Section 110(l) demonstration).

As is indicated in Section 2.1.4, this SIP revision will add to or replace existing SIP rules with requirements that are either as stringent or more stringent. The control strategies contained in this plan are expected to reduce emissions sufficient to demonstrate attainment of the PM_{10} NAAQS in the West Pinal PM_{10} Nonattainment Area. None of the changes will interfere with any applicable requirement concerning attainment, reasonable further progress, increments or visibility.

2.2.5 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.

EPA approved the use of AERMOD and Rollback modeling to demonstrate attainment of the PM_{10} NAAQS. Details of the analyses are included in *Chapter 7, Attainment Demonstration And Reasonable Further Progress*, *Appendix C: Pinal County PM_{10} Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days (Modeling TSD)*, and *Appendix D: Pinal County PM10 Nonattainment Area 2018 Attainment Demonstration and Controlled Emissions Inventories (Attainment TSD)*.

2.2.6 Evidence, where necessary, that emission limitations are based on continuous emission reduction technology.

Not Applicable.

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

Information on emissions limits and recordkeeping/reporting requirements is included in *Chapter 6, Control Measures* and in the agriculture, construction, and general fugitive dust control rules in *Appendix G: Rules, Statutes, or Other Documents for Approval*.

2.2.8 Compliance/enforcement strategies, including how compliance will be determined in practice.

Compliance and enforcement of the agriculture, construction, and general fugitive dust control strategies included in this plan are discussed in Sections 0, 6.2.3, and 6.3.3.

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

This plan does not rely on any special economic and technological justifications in support of the control strategies contained within.

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3 INTRODUCTION

This chapter describes the purpose of this West Pinal County PM_{10} Nonattainment Area SIP revision, summarizes the regulatory background and requirements for the area, and provides a general overview of the nonattainment area and County.

3.1 Statement of Introduction and Purpose

Pursuant to Section 107(d)(3) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) redesignated an area in western Pinal County from an "unclassifiable" area to a "moderate" nonattainment area for the 1987 24-hour PM_{10} National Ambient Air Quality Standards (NAAQS). The EPA based its redesignation on recorded violations of the standard at ambient monitoring sites 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 (SIP) revision.[7] The purpose of this SIP revision is to demonstrate how the West Pinal County nonattainment area will attain the 1987 24-hour PM_{10} NAAQS.

3.2 National Ambient Air Quality Standards

Title I of the CAA requires the EPA to set National Ambient Air Quality Standards (NAAQS) for those pollutants that are considered harmful to both the 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.[8]

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 (μ/m^3). Each standard also has a distinct averaging time in order to provide the necessary level of protection.[9] These standards are periodically reviewed and are either retained or revised based on review of scientific literature and analyses.[10]

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[7] *See* Arizona Revised Statutes (Ariz. Rev. Stat.) §49-406 (2015).
[8] *National Ambient Air Quality Standards*, http://www.epa.gov/air/criteria.html (last visited Jun. 30, 2015).
[9] *Id*.
[10] *See* 42 U.S.C. § 7409 (2015).

3.3 U.S. EPA's Particulate Matter NAAQS

Particulate matter, or particle pollution, is a complex mixture of small particles and liquid droplets found in the air. Particulate matter (PM) can be directly emitted by a source such as smokestacks, fires, unpaved roads, or construction sites.[11] These particles can also be formed in the atmosphere when gaseous pollutants such as sulfur dioxides and nitrogen dioxides react to form fine particles.[12]

On July 1, 1987, EPA revised the NAAQS for PM, replacing Total Suspended Particulates as the indicator for particulate matter with a new indicator, PM_{10}.[13] 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 150 micrograms per cubic meter (µg/m^3) more than once per year on average over a consecutive three-year period.[14] Table 3-1 provides a summary of the PM_{10} NAAQS for each of EPA's review cycles from 1987 through 2012.[15]

Table 3-1 PM_{10} NAAQS History

Date	Final Rule Citation	Primary/ Secondary	Averaging Time	Level	Form
1987	52 Fed. Reg. 24634 Jul 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 Fed. Reg. 38652 Jul 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.[16]
			Annual[17]	50 µg/m^3	Annual arithmetic mean averaged over 3 years.
2006	71 Fed. Reg. 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 Fed. Reg. 3086	Primary and	24-hour	150 µg/m^3	Not to be exceeded more than

[11] *See* 42 U.S.C. § 7602(h) (2015).
[12] *Particulate Matter*, http://www.epa.gov/airquality/particlepollution/ (last visited Jun. 30, 2015).
[13] *See generally*, Revisions to Ambient Air Quality Standards for PM, 52 Fed. Reg. 24634 (Jul. 1, 1987) (codified at 40 C.F.R. pt. 50).
[14] As calculated rounding to the nearest 10 µg/m3, according to 40 C.F.R. § 50, Appendix K (2015) (effective 2006). For example, according to the rounding convention dictated by Appendix K, a value of 154 µg/m^3 is rounded down to 150 µg/m^3.
[15] The historical PM NAAQS also include "total suspended particulates" and $PM_{2.5}$, neither of which is included in this summary.
[16] 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 Fed. Reg. 45592 (Jul. 30, 2004) (codified at 40 C.F.R. pts. 50 and 58).
[17] EPA revoked the annual PM_{10} NAAQS in 2006. *See National Ambient Air Quality Standards for PM*, 71 Fed. Reg. 61144 (Oct. 17, 2006) (codified at 40 C.F.R. pt. 50).

	Jan. 15, 2013	Secondary			once per year on average over a 3-year period.

3.4 Regulatory Background

Most of Pinal County was designated as "unclassifiable" for PM_{10} by operation of law upon enactment of the 1990 CAA amendments. On October 14, 2009, EPA notified the Governor of Arizona and leaders of four Indian Tribes, whose lands are located entirely, or in part, within Pinal County, that air quality monitoring data for the period 2006 to 2008, revealed the area was violating the 24-hour PM_{10} NAAQS.[18] EPA then began the process to redesignate the area as nonattainment for the 24-hour PM_{10} NAAQS.

Under Section 107(d) of the CAA, governors must submit boundary recommendations for violating areas. ADEQ conducted a "nine factor" analysis based on the analytical approach established in EPA's guidance for the 1997 8-hour ozone, the 1997 $PM_{2.5}$ NAAQS, and the 2006 $PM_{2.5}$ NAAQS.[19] ADEQ evaluated Pinal County as well as neighboring counties to determine what areas were violating or contributing to violations of the NAAQS. On March 23, 2010, the Governor of Arizona submitted to EPA nonattainment area boundary recommendations, excluding Tribal Lands.[20]

On May 31, 2012, EPA redesignated an area in western Pinal County, Arizona, from "unclassifiable" to "nonattainment" for the 1987 PM_{10} NAAQS.[21] The "West Pinal County PM_{10} Nonattainment Area" was classified as a "moderate area" under CAA § 188. The CAA imposes certain planning requirements for moderate nonattainment areas to reduce PM_{10} emissions and attain the NAAQS. On December 30, 2013, ADEQ submitted a revision to the Arizona SIP to meet certain CAA obligations for PM_{10} nonattainment areas (emissions inventory, ambient monitoring data, and base year modeling) and commitments to comply with additional requirements. Because the 2013 revision did not contain all required elements for nonattainment area SIP, ADEQ withdrew the plan from consideration for EPA action on February 19, 2014, in order to develop the remaining elements.

[18] Letter from Laura Yoshii, Acting Regional Administrator, EPA Region IX to Governor Brewer of Arizona (Oct. 14, 2009).

[19] *See Area Designations for the Revised 24-Hour Fine Particle National Ambient Air Quality Standards*, memorandum to Regional Administrators, Regions I-X, from Robert J. Meyers, Acting Assistant Administrator, Office of Air and Radiation (June 8, 2007).

[20] Letter from Governor Brewer of Arizona to Jared Blumenfeld, Regional Administrator, EPA Region IX (Mar. 23, 2010).

[21] *Redesignation of West Pinal County as Nonattainment for PM_{10}*, 77 Fed. Reg. 32024 (May 31, 2012) (codified at 40 C.F.R. pt. 81.303).

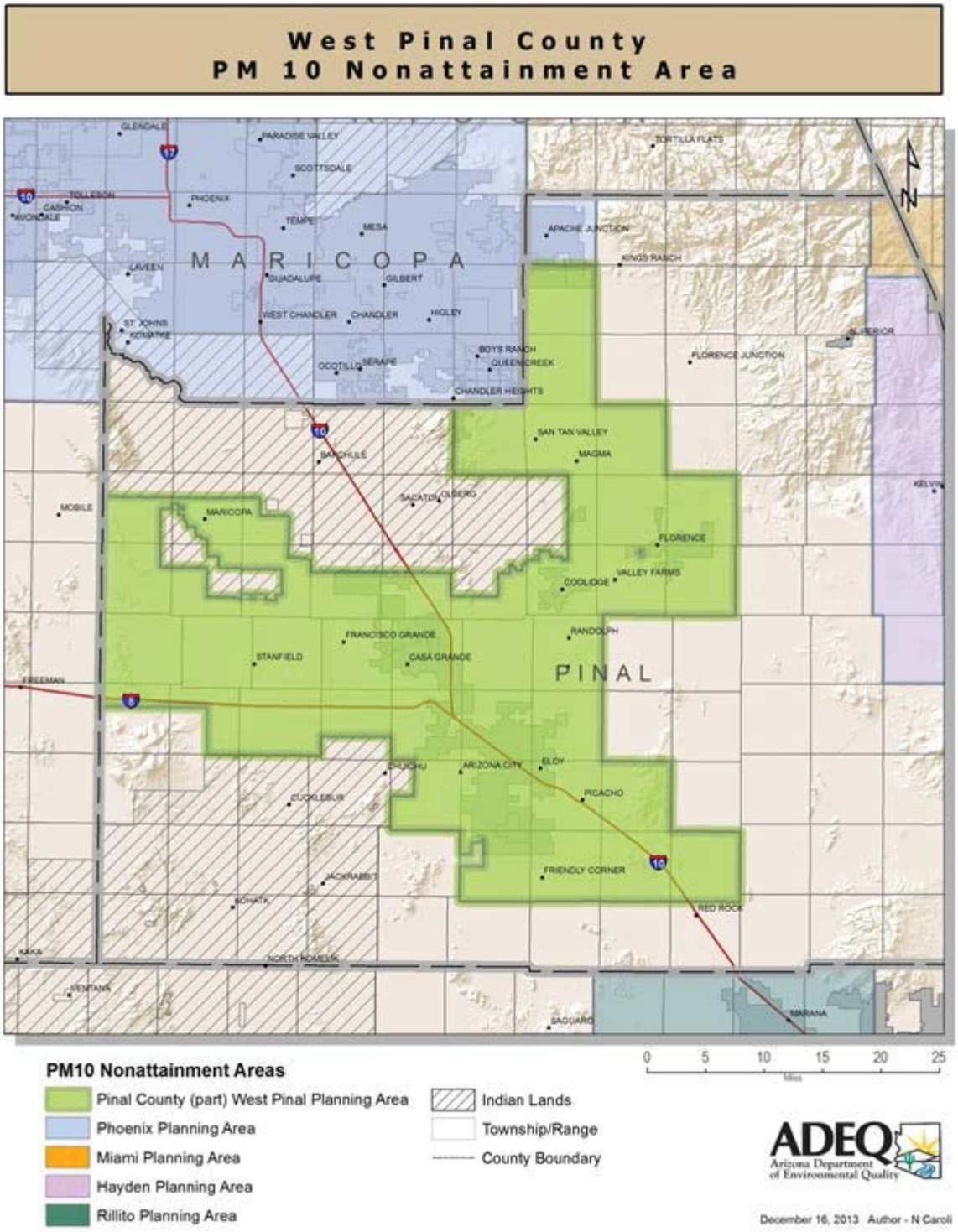
3.5 West Pinal County PM_{10} Nonattainment Area Description

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

3.5.1 West Pinal County PM_{10} Nonattainment Area Boundary

The boundaries of the West Pinal County PM_{10} nonattainment area are defined at 40 C.F.R. § 81.303. Figure 3-1 below maps the location of the area.

Figure 3-1 Map of West Pinal County PM_{10} Nonattainment Area



Source: Arizona Department of Environmental Quality

3.5.2 Geography and Climate

Pinal County is located in Central Arizona, lying within a basin between the Phoenix and Tucson metropolitan areas and encompasses approximately 5,365.61 square miles.[22] The eastern portion of the county is mountainous with elevations up to 6,441 feet,[23] whereas the western region primarily consists of low desert valleys. The county includes several cities that are primarily located in low desert areas. Table 3-2 provides a list of incorporated cities and elevations that are located within Pinal County jurisdiction.

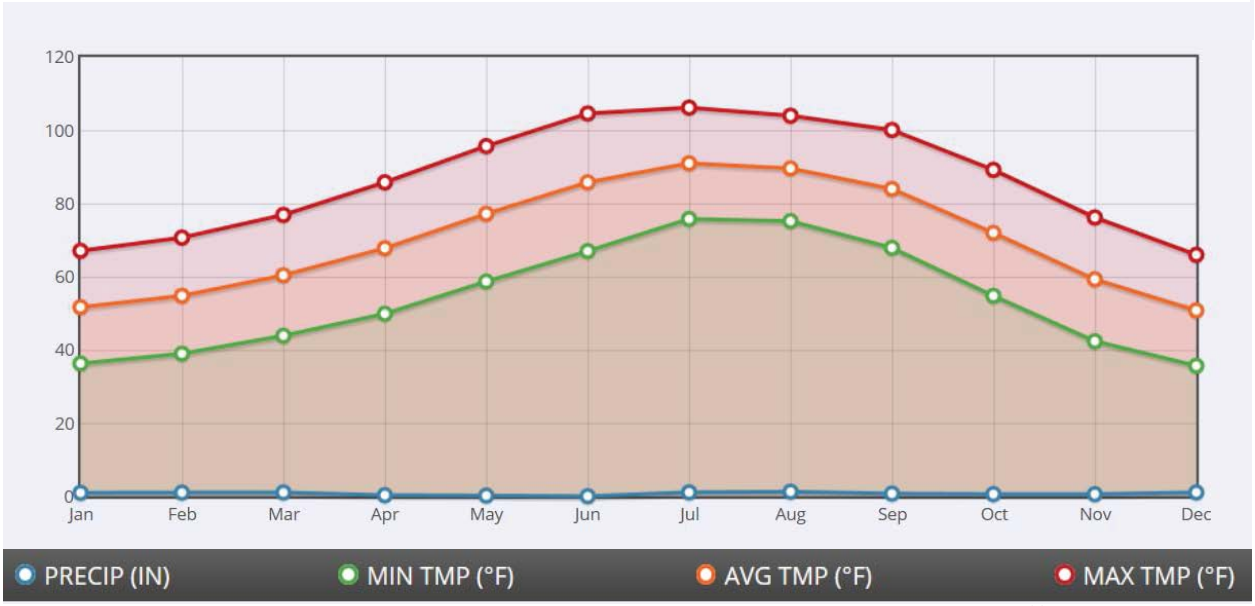
Table 3-2 Names and Elevations of West Pinal County Cities

City Name	Elevation (ft.)
Apache Junction	1,754
Casa Grande	1,403
Coolidge	1,428
Eloy	1,555
Florence	1,473
Maricopa	1,171
Superior	2,842
Source: How High is Greater Phoenix?[24]	

The climate is arid in the nonattainment area and the county in general. As a representative example, Casa Grande National Monument average monthly maximum temperatures range from 66.0°F to 106.2°F, and the average monthly minimum temperatures range from 35.7°F to 75.8°F.[25] The driest time of the year for the County is typically April through June followed by September through November. Average monthly precipitation ranges from 0.061 up to 1.28 inches. Figure 3-2 shows the annual average monthly temperatures and precipitation for the Casa Grande National Monument in Pinal County, Arizona.

[22] United States Census Bureau, *Pinal County, Arizona QuickFacts Beta*, http://quickfacts.census.gov/qfd/states/04/04021.html (last visited Jun. 29, 2015).
[23] *Report to Citizens for Fiscal Year 2011-2012*, (Jun. 29, 2015) http://www.pinalcountyaz.gov/departments/mfr/documents/reporttocitizens2011_12.pdf .
[24] *How High is Greater Phoenix*, (Jun. 29, 2015) http://phoenix.about.com/od/natureandenvironment/a/elevation_4.htm.
[25] National Centers for Environmental Information, *Data Tools: 1981-2010 – Casa Grande National Monument, Arizona* (Jun. 29, 2015) http://www.ncdc.noaa.gov/cdo-web/datatools/normals.

Figure 3-2 Casa Grande National Monument, Arizona, Monthly Average Temperatures and Precipitation: 1981-2010 Normals



Source: NOAA National Centers for Environmental Information – Data Tools[26]

3.5.3 Population

According to the Arizona Department of Administration (ADOA), the West Pinal PM10 Nonattainment Area has a total population of 259,141 for the emissions inventory base year 2008.27 Residence data shows that 136,790 of the population lived in the incorporated areas (Cities/Towns), 34,937 people lived in unincorporated (non-CDP) areas, and 87,414 lived within the Census Designated Places (CDP).28 Table 3-3 shows the population distribution for each area within the West Pinal County PM10 Nonattainment Area.

[26] *Id*.
[27] Internal Report from the Arizona Department of Administration, October 31, 2013.
[28] 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 (e.g. cities/towns).

Table 3-3 West Pinal County PM_{10} Nonattainment Area Population Distribution – 2008 Emissions Inventory Base Year

Place	Population
Apache Junction City	4
Casa Grande City	48,096
Coolidge City	12,236
Eloy City	14,620
Florence Town	22,574
City of Maricopa	38,794
Queen Creek Town	467
Ak-Chin Village CDP	5
Arizona City CDP	9,781
Blackwater CDP	0
Cactus Forest CDP	555
Chuichu CDP	0
Gold Canyon CDP	11
Picacho CDP	440
Red Rock CDP	0
San Tan Valley CDP	75,932
Stanfield CDP	691
Total Population within the Nonattainment Area:	**259,141**
Source: Arizona Department of Administration - October, 2013, Internal Report	

3.5.4 County Economy

The eastern portion of Pinal County is characterized as copper mining communities. The communities of Mammoth, Oracle, San Manuel, and Kearny have traditionally been active in copper mining, smelting, milling and refining. The towns of Apache Junction, Arizona City, Coolidge, Eloy, and particularly Casa Grande have expanded and diversified their economic base to include manufacturing, trade, and services.[29] This expansion of the economy has been facilitated by the location of the area in the major growth corridor between Phoenix and Tucson and also by the growth of Mesa, near Apache Junction.[30]

Table 3-4 provides a percentage distribution of the total employed population by various sectors. Total civilian employed population has increased by 3.7% since 2010.[31]

[29] *Pinal County Statistics* (Jun. 29, 2015), http://www.pinalcountyaz.gov/ed/businessconnections/Pages/PinalCountyStatistics.aspx.
[30] *Id*.
[31] U.S. Census Bureau, *American FactFinder – Selected Economic Characteristics* (Jun. 29, 2015), http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml (deduced from comparing 2010 to 2013 for Pinal County, AZ).

Table 3-4 Pinal County Civilian Employed Population 16 Years and Over – 2013 U.S. Census Bureau

Industry	Population	Percentage
Agriculture, forestry, fishing and hunting, and mining	5,290	3.8%
Construction	8,708	6.3%
Manufacturing	13,831	10.0%
Wholesale trade	2,010	1.5%
Retail trade	18,433	13.4%
Transportation and warehousing, and utilities	5,934	4.3%
Information	3,424	2.5%
Finance and insurance, and real estate and rental and leasing	8,659	6.3%
Professional, scientific, and management, and administrative and waste management services	10,817	7.9%
Educational services, and health care and social assistance	27,015	19.6%
Arts, entertainment, and recreation, and accommodation and food services	16,068	11.7%
Other services, except public administration	6,103	4.4%
Public administration	11,470	8.3%
Total Civilian Employed Population	137,762	100.0%
Source: U.S. Census Bureau, 2013. American Community Survey[32]		

The median household income in Pinal County was $49,756 in 2013. The median household income decreased by just 0.07% from 2010 to 2013, while the mean increased by 5.65% during the same timeframe.[33]

In 2008, the number of permits issued for residential buildings and units were 3,016 and 3,020, respectively.[34] By 2014, the number of reported permits issued for buildings and units issued decreased to 1,729 and 1,744, respectively.[35] Table 3-5 provides a four-year annual summary of the issued building permits in Pinal County.

[32] *Id*.
[33] *Id*.
[34] *Building Permits,* U.S. Census of Bureau, *http://censtats.census.gov/bldg/bldgprmt.shtml?* (last visited Jun. 15, 2015).
[35] *Id*.

Table 3-5 Annual New Privately-Owned Residential Building Permits

Year	Buildings	Units	Cost
2014	1,729	1,744	$318,720,727
2013	2,129	2,144	$344,388,193
2012	1,776	1,823	$244,641,995
2011	975	978	$126,271,132
2010	1,597	1,597	$206,850,342
2009	2,182	2,182	$284,576,575
2008	3,016	3,020	$370,613,362
Source: Building Permits - U.S. Census Bureau[36]			

3.6 General SIP Approach - Regulatory Requirements and Guidance

In November 1990, the U.S. Congress enacted a series of amendments to the CAA. One of the primary effects of the revision was to expand and clarify the planning provisions for those areas not meeting the NAAQS. The CAA, as amended, authorizes comprehensive federal and state programs to provide for attainment and maintenance of the NAAQS. Section 3.6.1 outlines CAA requirements for moderate PM_{10} nonattainment areas. In addition, EPA has published guidance documents to clarify environmental regulations relating to attainment of the NAAQS and to assist in developing approaches for implementing those regulations. Section 3.6.2 summarizes applicable EPA guidance.

3.6.1 Clean Air Act Requirements for Nonattainment Area Plans

The 1990 CAA amendments identify specific emission reduction goals, require both a demonstration of Reasonable Further Progress (RFP) and attainment, and incorporate more stringent sanctions for failure to attain or to meet interim milestones. CAA Title I Part A, and Title I Part D, Subparts 1 and 4 are applicable to PM_{10} plans. Table 3-6 lists the CAA requirements and explains how the demonstrations contained in this document satisfy those obligations. Pollutant specific requirements for moderate PM_{10} nonattainment areas are found in §§ 188 through 190 of the CAA, and the general planning and control requirements for nonattainment area plans are found in CAA §§ 110 and 172.

[36] *Id.*

Table 3-6 Clean Air Act (CAA) Requirements for Moderate PM_{10} Nonattainment Area SIPs

CAA Citation	Action to Meet Requirement	Location in Document
CAA Title I – Air Pollution Prevention and Control; Part A – Air Quality and Emissions Limitations; Section 110 – Implementation Plans		
110(a)(2)(A)	Requires that implementation plans "include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this chapter." Chapter 6 describes the measures implemented to reduce PM_{10} emissions and ensure future attainment of the NAAQS.	Chapter 6.
CAA Title I – Air Pollution Prevention and Control; Part D – Plan Requirements for Nonattainment Areas; Subpart 1 – Nonattainment Areas in General; Section 172. Nonattainment Plan Provisions in General; Subsection 172(c) Nonattainment Plan Provisions		
§ 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."* Chapter 6 contains an explanation of applicable RACM for PM_{10} sources in the nonattainment area. Chapter 7demonstrates the area will attain the air quality standards with all implemented controls.	Chapter 6 and Chapter 7.
§ 172(c)(2) – RFP [Reasonable Further Progress]	*"Such plan provisions shall require reasonable further progress" defined in CAA Sec. 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."* This submittal demonstrates, in accordance with EPA Guidance, that the West Pinal County Nonattainment Area will achieve required emissions reductions within the required timeframes necessary to attain the PM_{10} NAAQS. As such, the RFP	Chapter 6 and Appendix D (Attainment TSD).

CAA Citation	Action to Meet Requirement	Location in Document
	requirement is met. Chapter 7 contains emissions projections after application of control strategies. Chapter 6 includes an explanation of measures responsible for the emissions reductions and implementation schedules for each rule.	
§ 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."* ADEQ maintains a historical and current database of actual emissions from State permitted point and area sources. The Pinal County Air Quality Control District maintains a similar database of actual emissions from County permitted sources. All non permitted source emissions data (i.e.: area and mobile sources) were developed for this plan. Base-year and projected base emissions are contained in Chapter 5.	Chapter 5 and Appendix B (EI TSD).
§ 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 West Pinal Nonattainment Area.	No additional location in document.
§ 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."* Arizona Revised Statutes Title 49, Chapter 3, Articles 1, 2, and 3	No additional location in document.

CAA Citation	Action to Meet Requirement	Location in Document
	establish ADEQ and local agency authority for preconstruction review and permitting. 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, all 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 New Source Review (NSR) provisions of these rules or Prevention of Significant Deterioration (PSD) for attainment areas. Sources under Pinal County jurisdiction are subject to the Pinal County Air Quality Control District, NSR program in Pinal County Code of Regulations, Chapter 3, Permits and Permit Revisions. 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. On June 29, 2015, EPA signed a limited approval/limited disapproval (LA/LD) of this SIP revision. ADEQ is under an obligation to correct the deficiencies identified by EPA. Until the corrections are approved, however, the rules subject to the LA/LD will be part of the SIP. Pinal County has a SIP-approved PSD program but lacks any form of EPA approval for nonattainment NSR. ADEQ therefore has original jurisdiction over major sources in Pinal County, but has delegated that jurisdiction to the County under A.R.S. § 49-107.	
§ 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."*	Chapter 6 and Chapter 7.

CAA Citation	Action to Meet Requirement	Location in Document
	Consistent with CAA requirements and EPA Guidance, this submittal includes emissions limitations, control strategies, and applicable compliance schedules for PM_{10} sources in the nonattainment area. Air quality modeling demonstrates that the area will attain the PM_{10} NAAQS with control measures fully implemented.	
§ 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 Section 110(a)(2) are detailed elsewhere in this Table.	No additional location in document.
§ 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."* ADEQ's intended modeling and emissions inventory methodologies (Inventory Preparation Plan) were submitted to and reviewed by EPA. Some modifications to the intended methodologies were required to make the plan more scientifically sound. The analyses to establish emissions limits and control strategies were conducted using AERMOD and modified rollback modeling with EPA's concurrence.	Chapter 7, Chapter 5, Appendix B (EI TSD), Appendix C (Modeling TSD), and Appendix D (Attainment TSD).
§ 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."* Consistent with EPA guidance, this submittal includes measures (beyond what is necessary to demonstrate attainment) to provide for emissions reductions equivalent to one year's average increment of RFP. As such, the contingency measure requirement is met.	Chapter 6 and Appendix D (Attainment TSD).

CAA Citation	Action to Meet Requirement	Location in Document
CAA Title I – Air Pollution Prevention and Control; Part D – Plan Requirements for Nonattainment Areas; Subpart 1 – Nonattainment Areas in General; Section 176. Limitations on Certain Federal Assistance		
§ 176(c) – [Transportation Conformity]	Transportation conformity is required under 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 the state air quality implementation plan (SIP). Conformity, to the purpose of the SIP, means that proposed transportation activities will not: 1) cause new air quality violations, 2) worsen existing violations, or 3) delay timely attainment of the national ambient air quality standards (including any required interim emission reductions or milestones).[37] The conformity rules at 40 CFR Parts 51.390 and 93 require the SIP to include maximum allowable emissions or a "budget" for on-road mobile sources. 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. Discussion of transportation conformity and on-road motor vehicle emissions budgets for the West Pinal PM_{10} planning area are included in Chapter 5.	Chapter 5, Section 5.5.
§ 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 West Pinal County Nonattainment Area must be addressed to assure PM_{10} emissions from any federal actions or plans do not exceed the rates outlined in 40 CFR 93.153(b) (see 58 FR 63253; November 30, 1993). Criteria for making determinations and provisions for general conformity	No other location in document.

[37] *State and Local Transportation Resources* (Jun. 29, 2015), http://www.epa.gov/OMS/stateresources/transconf/generalinfo.htm.

CAA Citation	Action to Meet Requirement	Location in Document
	are located in R18-2-1438 of the Arizona Administrative Code. ADEQ and Pinal 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 for this air quality planning area.	
CAA Title I – Air Pollution Prevention and Control; Part D – Plan Requirements for Nonattainment Areas; Subpart 4 – Additional Provisions for Particulate Matter Nonattainment Areas; Section 188. Classifications and Attainment Dates, Section 189. Plan Provisions and Schedules for Plan Submissions, and Section 190. Issuance of RACM and BACM Guidance		
§ 188(c)(1) – Attainment Dates	*"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 designated nonattainment for PM–10 under section 107(d)(4), the attainment date shall not extend beyond December 31, 1994."* A portion of West Pinal County was redesignated as a "moderate' nonattainment area effective July 2, 2012. The area is required to demonstrate attainment no later than the end of December 2018.	Chapter 7.
§ 188(d) – Extension of Attainment Date for Moderate Areas	*"Upon application by any State, the Administrator may extend for 1 additional year (hereinafter referred to as the "Extension Year") the date specified in paragraph (c)(1) if– (1) the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan; and (2) no more than one exceedance of the 24-hour national ambient air quality standard level for PM–10 has occurred in the area in the year preceding the Extension Year, and the annual mean concentration of PM_{10} in the area for such year is less than or equal to the standard level. No more than 2 one-year extensions may be issued under the subsection for a single nonattainment area."* ADEQ is not requesting an extension at this time.	No other location in document.

CAA Citation	Action to Meet Requirement	Location in Document
§ 189(a)(1)(A) – Moderate Areas, Plan Provisions	*"For the purpose of meeting the requirements of section 7502(c)(5)…, a permit program providing that permits meeting the requirements of section 7503 are required for the construction and operation of new and modified major stationary sources of PM–10."* The State and Pinal County permitting programs are described at "172(c)(5) – Permits for New and Modified Major Stationary Sources" of this table.	No other location in document.
§ 189(a)(1)(B) – Moderate Areas, Plan Provisions	*"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."* Attainment of the NAAQS is demonstrated through the use of AERMOD and modified rollback modeling.	Chapter 7 and Appendix D (Attainment TSD).
§ 189(a)(1)(C) – Moderate Areas, Plan Provisions	*"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]."* Implementation schedules for the West Pinal County reasonably available control measures are included in Chapter 6.	Chapter 6.
§ 189(a)(2)(B) – Moderate Areas, Schedule for Plan Submissions	*"18 months after the designation as nonattainment …"* This SIP replaces a plan originally submitted on December 30, 2013, a submittal that was later withdrawn.	No other location in document.
§ 189(c)(1) – 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."* Emissions reduction milestones are included in Chapter 7.	Chapter 7.

CAA Citation	Action to Meet Requirement	Location in Document
§ 189(c)(2) – Milestones	*"Not later than 90 days after the date on which a milestone applicable to the area occurs, each State in which all or part of such area is located shall submit to the Administrator a demonstration that all measures in the plan approved under this section have been implemented and that the milestone has been met. A demonstration under this subsection shall be submitted in such form and manner, and shall contain such information and analysis, as the Administrator shall require. The Administrator shall determine whether or not a State's demonstration under this subsection is adequate within 90 days after the Administrator's receipt of a demonstration which contains the information and analysis required by the Administrator."* ADEQ commits to submit all required demonstrations.	No other location in document.
§ 189(c)(3) – Milestones	*"If a State fails to submit a demonstration under paragraph (2) with respect to a milestone within the required period or if the Administrator determines that the area has not met any applicable milestone, the Administrator shall require the State, within 9 months after such failure or determination to submit a plan revision that assures that the State will achieve the next milestone (or attain the national ambient air quality standard for PM–10, if there is no next milestone) by the applicable date."* ADEQ commits to submit all required demonstrations.	No other location in document.
§ 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."* ADEQ determined that emissions of PM_{10} precursors do not contribute significantly to exceedances of the NAAQS in the West Pinal Nonattainment Area. See Appendix B (EI TSD), Exhibit 16 (Precursor Emission Summary) for details of the analysis.	Appendix B (EI TSD), Exhibit 16 (Precursor Emission Summary)
§ 190 – Issuance of RACM and BACM Guidance	*"The Administrator shall issue, in the same manner and according to the same procedure as guidance is issued under section 108(c), technical guidance on reasonably available control measures and best available control measures for urban fugitive dust, and emissions from residential wood combustion…"*	Chapter 3, Section 3.6.2

CAA Citation	Action to Meet Requirement	Location in Document
	ADEQ employed appropriate EPA guidance in the development of this plan.	

3.6.2 EPA Guidance

The guidance documents utilized in the preparation of this plan include:

- *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*. U.S. Environmental Protection Agency. EPA-454/R-05-001. August 2005.

- *PM_{10} SIP Development Guideline*. U.S. Environmental Protection Agency. EPA-450/2-86-001. June 1987.

- *PM-10 Guideline Document*. U.S. Environmental Protection Agency. EPA-452/R-93-008. April 1993.

- *State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*. U.S. Environmental Protection Agency. 57 Federal Register 13498; April 16, 1992.

- *State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Supplemental*. U.S. Environmental Protection Agency. 57 Federal Register 18070; April 28, 1992.

- *State Implementation Plans for Serious PM-10 Nonattainment Areas, and Attainment Date Waivers for PM-10 Nonattainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*. U.S. Environmental Protection Agency. 59 Federal Register 41998; August 16, 1994.

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4 AMBIENT AIR QUALITY MONITORING

The primary goal of the PM_{10} monitoring network in Pinal County is to collect ambient data necessary to determine compliance with the PM_{10} NAAQS and fulfill the regulatory requirements for PM_{10} monitoring in the nonattainment area.

This chapter provides a general description of the monitoring sites, equipment, a historic data summary, and current 24-hour NAAQS compliance in the West Pinal PM_{10} Nonattainment Area.

4.1 Monitoring Site, Equipment, and Quality Assurance Procedures

Arizona's air monitoring network consists of state and local stations 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. Pinal County maintains authority to conduct ambient surveillance under ARS § 49-473 and Pinal County Code, Section 1-1-040. In February of 2013, ADEQ and PCAQCD entered into a memorandum of agreement to clarify and define the responsibilities of a Primary Quality Assurance Organization (PQAO).[38]

Pinal County uses Federal Reference Method (FRM) monitors to collect filter based PM_{10} and automated Federal Equivalent Method (FEM) monitors for recording continuous PM_{10}. Historically three types of PM_{10} monitors have been used throughout the Pinal County monitoring network: (1) filter-based, high-volume samplers, (2) filter based, medium-volume samplers, and (3) Tapered Element Oscillating Microbalance (TEOM) monitors which measure PM_{10} on a continuous basis. Currently 8 monitors are in operation in the West Pinal County PM_{10} planning area; 6 continuous and 2 filter based medium-volume units with periodic sampling.[39] Several of the TEOM sites have also operated filter monitors prior to installation of continuous monitoring.

The installed monitors are maintained in accordance with federal siting and design criteria[40] and are consistent with the *Pinal County Air Quality Control District, 2014 Ambient Monitoring Network Plan and 2013 Data Summary,* approved by EPA for the West Pinal area on October 29, 2014.

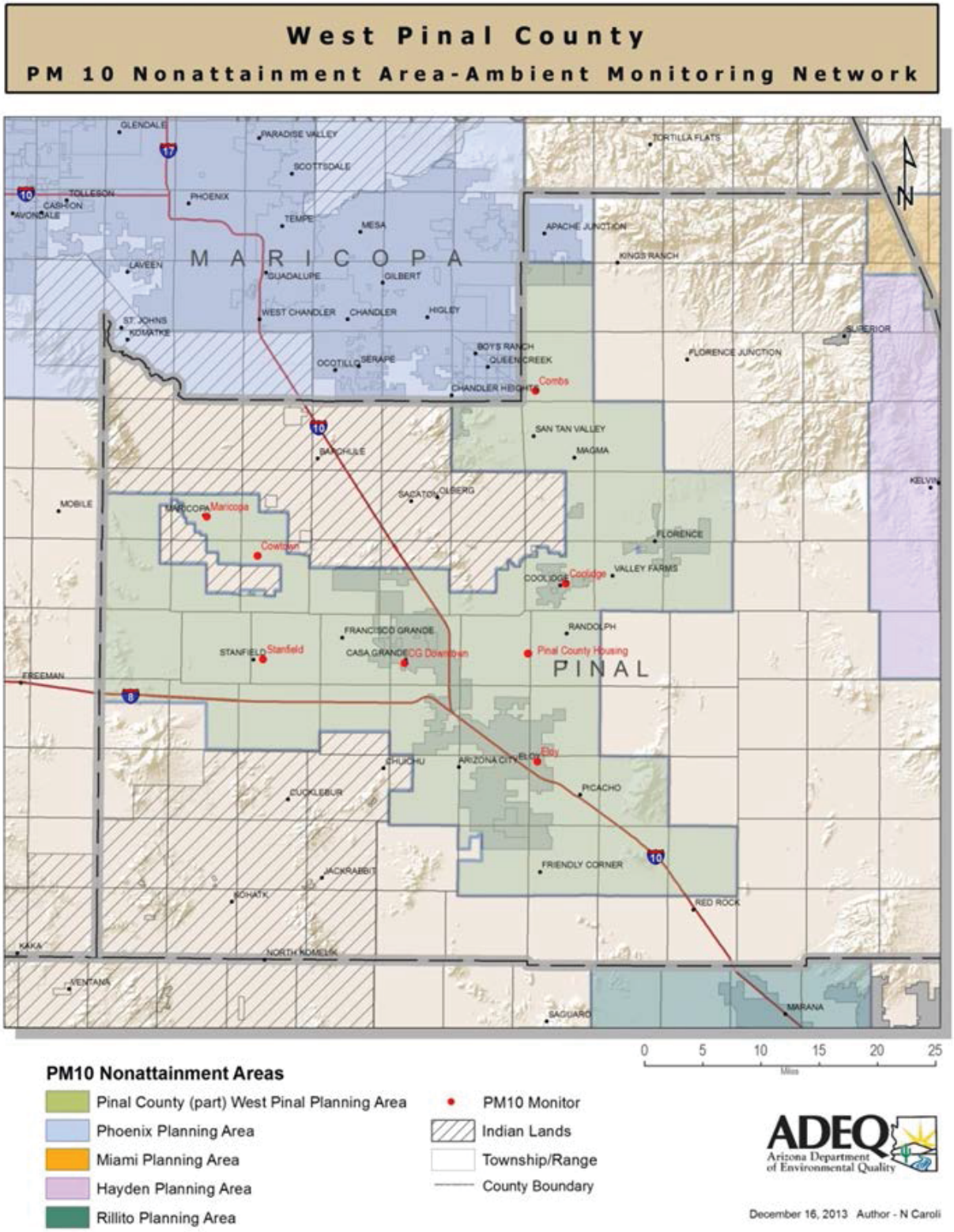
Figure 4-1 maps the locations of monitoring sites located within the West Pinal Nonattainment Area. Table 4-1 provides site descriptions for these monitors.

[38] Memorandum of Agreement No. ADEQ 13-033141(Feb. 13, 2013), *available at* http://agendasearch.pinalcounty az. gov/AttachmentViewer.aspx?AttachmentID=14187&ItemID=9048.

[39] There are no longer any high-volume samplers in the West Pinal PM_{10} Nonattainment Area; however, data from past measurements are still used to calculate design values for comparison to the NAAQS.

[40] Network Design Criteria for Ambient Air Quality Monitoring are located in 40 C.F.R. Part 58, Appendix D. Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring are found in 40 C.F.R. Part 58, Appendix A.

Figure 4-1 West Pinal County PM_{10} Nonattainment Area



Source: Arizona Department of Environmental Quality

Table 4-1 Active Monitors within the West Pinal County PM_{10} Nonattainment Area

AQS ID	Site Name	Latitude	Longitude	Classification [41]	Monitor Type	Street Address	City
04-021-0001	Casa Grande Downtown	+32.877583	-111.752222	SLAMS	TEOM	401 N Marshall St.	Casa Grande
04-021-3009	Combs School	+33.219111	-111.561111	SLAMS	TEOM	301 E Combs Rd	Queen Creek
04-021-3004	Coolidge Maintenance Yard	+32.978556	-111.514833	SLAMS	Medium-Volume [42]	212 E Broadway	Coolidge
04-021-3013	Cowtown Road	+33.010530	-111.972050	SPM[43]	TEOM	37580 W Maricopa	Maricopa
04-021-3014	Eloy County Complex	+32.757639	-111.554861	SLAMS	Medium-Volume [44]	801 N Main St	Eloy
04-021-3010	Maricopa County Complex (City of Maricopa)	+33.010530	-111.972050	SLAMS	TEOM	44625 W Garvey Rd	Maricopa
04-021-	Pinal County Housing	+32.891056	-	SLAMS	TEOM	970 N 11	Casa Grande

[41] SLAMS is defined at 40 C.F.R. 58.1 as a "State or local air monitoring stations(s)." Data from SLAMS sites are primarily used for comparison to the NAAQS. SPM or Special Purpose Monitors are generally monitors established for use in special studies and are not used to show compliance with minimum network requirements in 40 C.F.R. 58 (e.g. number and siting of monitors).

[42] The 2014 Pinal County Network Plan identifies collocated medium-volume PM_{10} samplers at the Coolidge Maintenance Yard effective July 1, 2013. The samplers operate (collect data) on a one in six-day schedule. Prior to this date, a high volume sampler was operated at this site.

[43] The Cowtown monitor is currently designated as a special purpose monitor (SPM). During its review of the 2012 Pinal County Network Plan, EPA commented that because the site has been active for longer than 24 months [and can be used for comparison to the NAAQS] it should be designated as a SLAMS monitor. Pinal County proposed to retain the SPM designation pending completion of a relocation process currently underway. See the *Pinal County Air Quality Control District, 2014 Ambient Monitoring Network Plan and 2013 Data Summary* for more information.

[44] The 2014 Pinal County Network Plan identifies a single medium-volume PM_{10} sampler at the Eloy County Complex effective July 1, 2013. The sampler operates (collects data) on a one in six-day schedule. Prior to this date, a high volume sampler was operated at this site.

AQS ID	Site Name	Latitude	Longitude	Classification [41]	Monitor Type	Street Address	City
3011	Complex		111.570500			Mile Rd	
04-021-3008	Stanfield County Complex	+32.881194	-111.962000	SLAMS	TEOM	36697 W Papago Rd	Stanfield

Source: US EPA Site Description Report - May 7, 2013; updated May 2015 based on Pinal County's 2014 Ambient Monitoring Network Plan.

4.2 Historical PM_{10} Data Summary

EPA defines an "exceedance" as a discrete event, where a measured value at a monitor is higher than the level of the standard. The standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. The number of expected exceedances at a site is determined by recording the number of exceedances in each calendar year and then averaging them over the most recent 3 year period.[45]

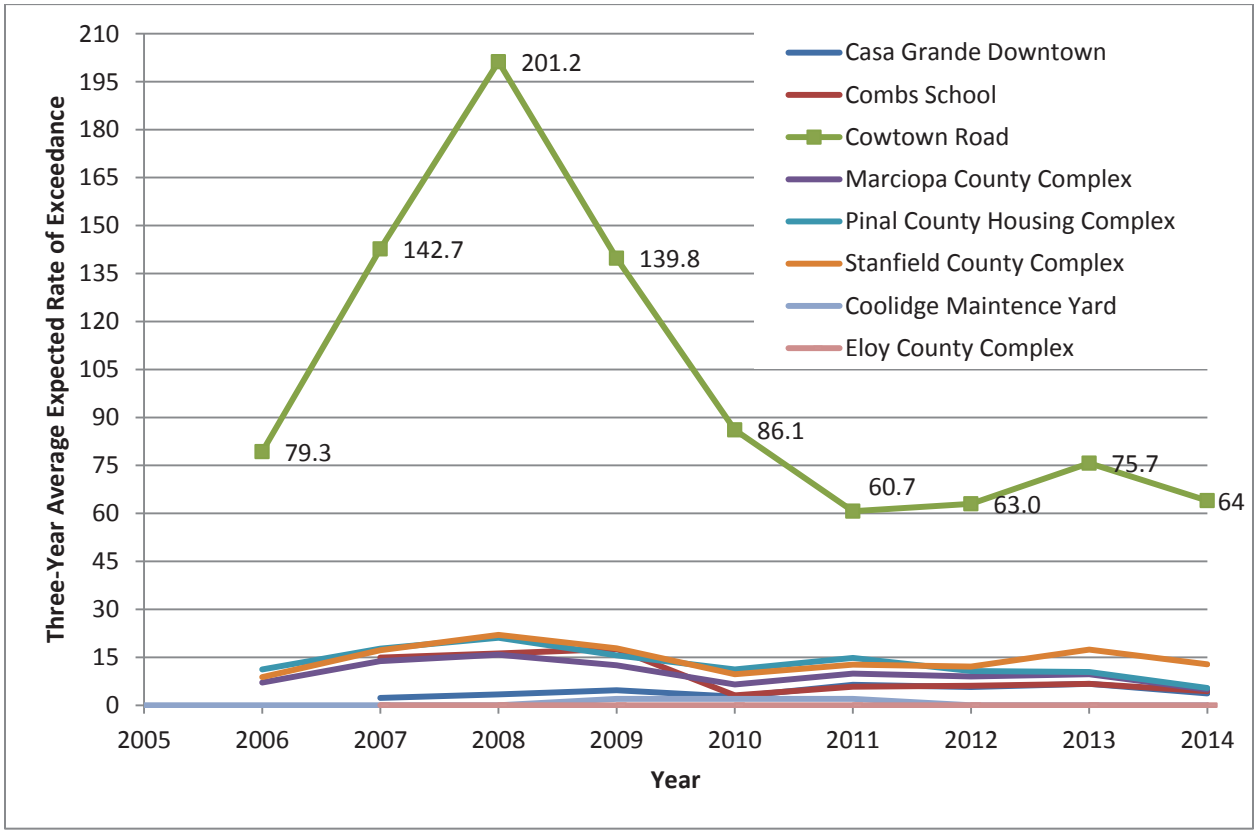
Non-continuous filter based samplers operate on a schedule based on the level of that monitoring site's ambient concentrations relative to the 24-hour standard. The required sampling schedule can range from every day to a minimum of once every sixth day. Because some monitoring locations do not record a value for each day of the year, an adjustment is made to the data collected to estimate the number of exceedances for that calendar year. To make the adjustment, it is assumed that the fraction of missing values (un-sampled days) that would have exceeded the level of the standard is identical to the fraction of measured values above this level. For example, one exceedance recorded by a one in six day monitor would count as 6.1 exceedances for that calendar year.[46]

Figure 4-2 shows the three-year average expected rate of exceedance for the current West Pinal monitoring network for years 2006 through 2014. The values presented from the Coolidge and Eloy monitoring sites are results from filter based PM_{10} samplers which collect samples on a one in six-day schedule. The six other monitoring sites, Casa Grande Downtown, Combs, Cowtown, Maricopa, Pinal County Housing, and Stanfield represent continuous data that were processed by PM_{10} TEOM air monitoring instrumentation.

[45] 24-hour values as calculated rounding to the nearest 10 µg/m^3, according to 40 C.F.R. § 50, Appendix K (2015) (effective 2006).

[46] *See* National primary and secondary ambient air quality standards for PM_{10}, 40 C.F.R. § 50.6; *Interpretation of the National Ambient Air Quality Standards for Particulate Matter,* 40 C.F.R. § 50, Appendix K (2015) (effective 2006).

Figure 4-2 Three-Year Average Expected Rate of Exceedance



Source: U.S. EPA Air Quality System[47]

4.3 24-Hours PM_{10} NAAQS Compliance - 2012-2014

As noted above, the 24-hour PM_{10} standard is met when the expected number of exceedances per year at each monitoring site is less than or equal to one on average over a three year period. Based on complete quality-assured data for 2012-2014, the West Pinal County area is not currently meeting the PM_{10} NAAQS. The findings indicate that all six monitoring stations that use continuous PM_{10} TEOM samplers yielded a three-year average expected rate of exceedance greater than one. The monitoring station at Cowtown recorded the highest three-year average expected rate of exceedance at 64 followed by the Stanfield monitor, which has a three-year average exceedance rate of 13. The filter based monitors at Coolidge and Eloy recorded no violations of the NAAQS.

[47] 2005-2014 Preliminary Design Value Report obtained on May 13, 2015. Data excludes regional (exceptional) events concurred by EPA.

Table 4-2 below includes a summary of the most recent three-year average expected rate of exceedance for each of the West Pinal monitors.

Table 4-2 2012 to 2014 Maximum 24-Hour Average PM_{10} Compliance

AQS ID	Site Name	2012		2013		2014		Three-Year Avg Exp. Rate of Exc.
		Max 24-Hr Avg	Exp. Exc.	Max 24-Hr Avg	Exp. Exc.	Max-24-Hr Avg	Exp. Exc.	
04-021-0001	Casa Grande Downtown	235	2	301	4	929	5	4
04-021-3009	Combs	205	5.1	299	3	247	5	4
04-021-3004	Coolidge	134	0	139	0	109	0	0
04-021-3013	Cowtown	698	60.7	1006	67.5	540	63.9	64.0
04-021-3014	Eloy	120	0	107	0	80	0	0
04-021-3010	City of Maricopa Complex (City of Maricopa)	256	8.6	333	4	238	2	5
04-021-3011	Pinal County Housing	541	5	241	5.1	402	6.1	5
04-021-3008	Stanfield	339	12.1	912	17	342	9.2	13
Exp. – Expected. Exc. – Exceedance.								

Source: U.S. EPA Air Quality System[48]

[48] AMP 450 report (Quick Look Criteria Parameters) and AMP 480 report (Design Value Report) dated July 23, 2015.

5 ANNUAL EMISSIONS INVENTORY

This section addresses the requirement to develop an annual baseline emissions inventory for the entire PM_{10} nonattainment area, whereas the attainment modeling summary in Chapter 7 addresses the design day input inventories specific to each monitor.

Section 172(c)(3) of the CAA requires that the base year inventory be a comprehensive, accurate, and current inventory of actual emissions in the nonattainment area. An annual emissions inventory helps identify which sources and source categories predominate in the generation of PM10 emissions across the nonattainment area. This ranking of source significance provides the basis for analysis of long-term emission trends impacted by changes in source activity rates and implementation of regulatory control strategies.

Through discussions between U.S. EPA, the Arizona Department of Environmental Quality (ADEQ), and the Pinal County Air Quality Control District (PCAQCD), a base year of 2008 was selected for the preparation of an emission inventory and an attainment demonstration. During 2008, exceedances of the 24-hour $PM_{2.5}$ NAAQS were recorded at Cowtown; exceedances of the 24-hour PM10 NAAQS were recorded at Maricopa, Cowtown, Stanfield, Casa Grande, Combs School, and Pinal County Housing.[49] Therefore, inventory calculations were based on affects on these monitors. Precursor emissions are discussed further in the precursor emission summary discussion located in Exhibit 16 of Appendix B, Emission Inventory Technical Support Document.

5.1 Meteorological Scenarios and General Methodology

Inventory analysis showed that two scenarios produce emissions and contribute to concentrations in excess of the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) of 150µg/m^3: windblown generation and activity-based generation. Separate and distinct sources contribute to each of the two emission generating scenarios, although there is some overlap between the sources. Therefore, ADEQ developed two different inventories for each base year to sum the total annual emissions.

During wind conditions 12 mph or higher, sources with disturbed soil spread a large proportion of the emissions throughout the nonattainment area (e.g. unpaved roads, fallow fields, etc.). Some source categorical activities release PM_{10} with or without wind because of their dust generating nature (e.g. earthmoving activities during construction and agricultural operations or driving on unpaved roads).

The spatial distribution of estimated PM_{10} emissions within the nonattainment area was facilitated by GIS shapefiles produced by PCAQCD and ADEQ. Shapefiles for population were

[49] Appendix A (Inventory Preparation Plan) A1-A2.

provided by Arizona Department of Administration. MAG provided paved road and on-road emission information. Sierra Research modeled nonroad emissions using EPA model default data for Pinal County. For other source categories (e.g., construction, confined animal feeding operations (CAFO), and railroads), emission estimates are based on activity rates of sources within the nonattainment area and emissions factors representative of these sources.[50] Where appropriate, local precipitation event data were factored into the annual fugitive dust emissions calculations according to EPA guidance (e.g., such as reported for paved and unpaved road emissions in AP-42[51]).[52]

5.2 Windblown Methodologies for the Base Years 2008 and 2018

5.2.1 Annual Windblown Methodologies

Windblown emissions were calculated using a modified version of the methodology described in the Maricopa Association of Governments' (MAG's) 2012 5% Plan, as a function of land use disturbance ratios and wind speed.[53] ADEQ determined adoption of the MAG windblown dust methodology as the most appropriate EPA approved windblown dust emission estimation methodology available. This is due to the similar meteorological characteristics of these neighboring counties and to provide consistency between the emission estimates for these two abutting PM_{10} nonattainment areas. Generally, the annual emissions are a summed function of the following actions:[54]

(a) each parcel in the nonattainment area was assigned a land use category with a distinct stable to disturbed land ratio,

(b) individual parcels were assigned the meteorological characteristics (i.e. wind speed and precipitation) of the closest nonattainment area monitor,

(c) friction velocities were calculated for hourly binned wind speeds,

(d) friction velocities were then converted to wind speed dependent emission rates for disturbed and stable lands,

(e) high wind event emission rates were adjusted to account for temporal variability in particle saltation and reservoir depletion, and finally

[50] *See* Appendix B (EI TSD) Section 5 Introduction.
[51] *Compilation of Air Pollutant Emissions Factors, AP-42*, U.S. EPA, http://www.epa.gov/ttn/chief/ap42/index.html (last visited July 29, 2013).
[52] *See* Appendix B (EI TSD) Section 5.
[53] *See* Appendix B (EI TSD) Section 3.1.2.
[54] For an example calculation for windblown dust calculations specific to modeling design day calculations, but similar to this methodology, please see Chapter 7 Section 7.1.2.4.

(f) individual wind event emissions were calculated based on wind speeds and on adjusted hourly emissions rates for each parcel and summed over the entire year.

a. Assigning Each Parcel to a Land Use Category

To account for land use differences and corresponding variances in the ratio of disturbed versus stable land, each parcel was allocated to a particular land use category. See Table 5-1 for a list of the land use categories for windblown emissions.

Table 5-1 Land Use Categories for Windblown Emissions

Developed Urban Lands[55]
Developed Rural Lands (low density residential)
Paved Roads[56]
Unpaved Roads
Cleared Areas
Residential Construction
Dairies
CAFOs
Desert Shrubland
Agriculture
Commercial Construction
Other
Site Development

Pinal County Air Quality Control District (PCAQCD) generally assigned a ratio of disturbed versus stable for each land use type according to predicted or regulated use of land and local expertise. However, for some land use categories such as agricultural crops, construction land use, and unpaved road, disturbed versus stable ratios had to be deduced more complexly because of ratio variability within the land use.

5.2.1.1.1 Agricultural crop land use category ratio [57]

The agriculture crop land use category's disturbed versus stable ratio depends on the crop distribution (barley, corn, cotton, etc.) and corresponding crop stage (i.e. planting, harvesting, growing season, and between harvest and planting) ADEQ used GIS shapefiles, the 2007 USDA Agricultural Census, and a PCAQCD supplied crop calendar to determine the distribution of disturbance levels by crop type across the year. Once the crop distribution and associated crop specific stability ratio within the nonattainment area were determined, ADEQ calculated the

[55] Note that unpaved parking is not included in this land use category list, although it is listed as an activity for activity-based emissions. For windblown emissions, unpaved parking is enveloped within windblown dust subtotals from Developed Urban, Developed Rural, and Cleared Areas land use categories.
[56] The disturbance (and therefore the emission rate) for paved roads was essentially zero because of paved road maintenance within Pinal County. *See* Appendix B (EI TSD) Section 3.1.2, Table 3-46, fn. 103.
[57] *See* Appendix B (EI TSD) Section 5.2 - Agricultural.

annual weighted average of disturbed and stable land for all agricultural cropland in the nonattainment area. These two weighted averages were assigned to each parcel in the nonattainment area for the crop land category.

5.2.1.1.2 Construction land use categories ratios[58]

Construction ratios varied depending the type of construction occurring on each parcel (i.e. residential, commercial, or site development). ADEQ utilized recommended assumptions from the WRAP Fugitive Dust Handbook to determine the percentage of land on an active site that is disturbed during construction. This percentage of land was adjusted to account for dust suppression controls on construction sites in 2008.

5.2.1.1.3 Unpaved roads land use ratio[59]

Road square footage within the nonattainment area was derived from a road network provided by Pinal County. Unpaved road disturbance level varies depending on whether the roads in question are private, public, agriculture roads, or trails. For all roads types except public, the roadway was considered fully disturbed. Due to regular maintenance on public roadways, these roadways were assumed to be 75% disturbed and 25% stable.

b. Grouping Parcels by Distance to Assign Meteorological Data[60]

Emission rates are wind speed dependent, therefore, assigning the most accurate meteorological data as possible to each parcel is crucial to determine an accurate emission rate. In order to assign meteorological data, each land parcel in the nonattainment area was grouped to whichever of the six violating PM_{10} nonattainment area monitoring sites was closest as measured from the center point of the parcel to the monitor.

c. Calculation of Friction Velocity for Wind Speed Bins

Friction velocity is the shear stress, or, the force of friction imposed by a fluid's flow (in this case wind) passing over a parallel boundary surface (in this case the Earth's rough planar surface), re-phrased in units of velocity.[61] It becomes relevant to determine speed dependent friction velocities for calculation of emission rates. Sierra Research determined threshold friction velocity utilizing previously reported methods and data.

The threshold friction velocity is the minimum speed at which windblown dust emissions are initiated at ground level, and it will often depend on the impacted soil types.[62] MAG's previous

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[58] *See* Appendix B (EI TSD) Section 5.2 - Construction.
[59] See Appendix B (EI TSD) Section 3.1.2 for more information.
[60] See Appendix B (EI TSD) Section 5.2 for more information.
[61] *See generally*, CLAYTON T. CROWE, ET AL., ENGINEERING FLUID MECHANICS 281-301 (Jennifer Welter et al. eds., 9th ed. 2009).
[62] *See* Maricopa County, 2008 Maricopa PM10 Periodic Emission Inventory, Appendix 4, 4-4 *available at* *http://www.maricopa.gov/aq/divisions/planning_analysis/docs/2008_PM10/App4_WindblownDust.pdf* .

analysis of non-agricultural land use soils,[63] and Sierra Research's subsequent analysis of agricultural land use soils,[64] show that all soils throughout the nonattainment area display similar relationships concerning wind speeds and corresponding PM10 concentrations. Examination of local PM10 concentration and meteorological monitoring show that when wind speeds are 12 mph or higher, average PM10 concentrations are consistently higher than concentrations at lower speeds.[65] Therefore, throughout the emission inventory analysis (and attainment analysis), ADEQ follows MAG's conclusion that 12 mph is a valid approximation of the threshold 10 meter wind speed required for the initiation of windblown dust in the nonattainment area. Therefore, ADEQ concludes that 12 mph or more is a high wind speed.

Recorded wind speeds were first normalized to speeds to a 10 meter measurement height because wind speeds change with the height from the earth's surface due to a lessening of surface roughness friction drag with increased height from the surface.[66] To normalize the recorded wind speeds to the same height of 10 meters, ADEQ converted wind speeds at the height they were recorded to speeds at 10 meters by using the wind profile power law equation so that the measured speed heights would be consistent with the applicable fluid dynamics equation to convert the wind speeds in the friction velocities. ADEQ then grouped these speeds into one mph wind speed bins (i.e. 12, 13, 14).[67] The resulting whole number 10 meter speeds were used for all ensuing calculations throughout the nonattainment area.

Each wind bin speed was subsequently converted to friction velocities for further calculations. To do this, ADEQ relied on previous wind tunnel studies conducted in Arizona. The studies resulted in a nonattainment-wide applicable coefficient to allow conversion of 10 meter wind speeds into friction velocities using a speed dependent equation.[68]

d. Converting Friction Velocities to Emission Rates (Vertical Flux Rate)

Emission factors calculated previous to the initiation of this plan were applied to all disturbed soils throughout the nonattainment area. These emission factors were based on wind tunnel studies of disturbed exposed soils in Maricopa and Pinal Counties. These factors were proportionally modified to account for stable soils, based on another study conducted in Barstow, California.[69]

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[63] *Id.* at 4-5.
[64] See Appendix B, Exhibit BVI for more information.
[65] See generally "Evaluation of Aerosol Production Potential of Type Surfaces in Arizona," prepared for Engineering-Science by W.G. Nickling and J.A. Gillies, for EPA Contract No. 68-02-380, September 1986. See Appendix B, Exhibits BV and BVI.
[66] See generally ENGINEERING FLUID MECHANICS, *supra* note 61.
[67] This approach is unlike in the mag plan where they grouped wind speeds in 5 mph bins because no speeds above 25 mph were recorded at Pinal County Housing over the 2008 year, hence all the high wind speeds were grouped within just two 5 mph bins, allowing for only limited emission rate accuracy. See Appendix B, Exhibit BV for more information.
[68] See Appendix B (EI TSD), Exhibit BVI for more information regarding the Prandtl equation.
[69] 2008 Maricopa PM10 Periodic Emission Inventory, *supra* note 62 at 4-8.

The Arizona wind tunnel studies provided limited information on emission rates from stable soils.[70] However, the results of similar studies conducted in Barstow, California indicated that the stable soil produced emissions at a rate of about 12 to 20% of the disturbed soil.[71] Therefore, after the disturbed soil emission factors were computed, the Barstow emission factor ratio (varying between the aforementioned percentages) was applied to the disturbed soil emission factors, in order to compute the emission factors for each wind bin speed.[72]

For various data availability reasons, emission factors for disturbed and stable soils were computed for both (and only) the Pinal County Housing and the Stanfield monitors. The other four monitors were grouped to either the emission factors computed for PCH or to those for Stanfield, depending on which of the two monitors was closest. These emission factors were then applied to the wind speed bins (velocities) and ensuing parcels for each of the monitors.

e. Emission Adjustment Factor Application[73]

Additionally, in the high wind annual calculation process ADEQ applied an adjustment factor to account for temporal variation of emission rates during a wind event. Windblown emission factors are generally an estimation of maximum emission potential and, thus, are not always representative of the actual environment. Specifically, land use dependent emission factors assume static emission rates for a given wind speed throughout the progression of a wind event. In reality, emission rates vary with time as well as wind speed for reasons such as lack of airborne particles available for re-entrainment (beginning of wind event) or reservoir depletion of ground particles (end of wind event). Therefore, ADEQ applied distribution curves to the estimated emissions during criterial high wind events throughout 2008 to more accurately represent 2008 annual emissions.

f. Sum of High Wind Emissions[74]

As a last step, for each parcel, individual wind event emissions were calculated based on wind speeds and adjusted hourly emissions rates. These parcel specific emissions were then summed over the entire year of 2008.

5.2.2 Adjusting and Projecting the 2008 Base Year Emissions to 2018

The disturbed versus stable ratios for the above described land use categories were adjusted to project emissions from 2008 to 2018. Adjusting these ratios varied depending on land use. For example, some concentrated animal feeding operations (CAFOs) have closed since 2008 and are projected to be cleared areas in 2018. Unpaved roads that have either undergone or are scheduled in Transportation Infrastructure Plans (TIPs) to undergo improvements such as

[70] *Id*.
[71] *Id*.
[72] Appendix B (EI TSD), Exhibit BV-3.
[73] For more information, see Appendix B (EI TSD), Exhibit BVII.
[74] Note that high wind events with .01 inches or more of recorded precipitation at a monitor were not included.

paving were assigned controlled emissions rates dependent on the control applied. For construction, analysis of permit issuance and projected population growth was used to adjust emissions to 2018.[75]

5.3 Activity-Based Emissions for the Base Years 2008 and 2018

Below are short summary glimpses as to how activity emissions were calculated for the nonattainment area annual inventories. These emissions calculations do not take wind into account. Emissions for each category presented in Table 5-2 were calculated for one year and results from each category were summed to represent all activity emissions within the nonattainment area over an entire year. More information is in the Emission Inventory TSD in the sections cited for each category below.

Table 5-2 Activity-Based Emission Source Categories

Ag Fields (Harvesting & Tilling)
CAFOs
Dairies
Paved Road
Unpaved Road (Public, Private, Agricultural, and Trails)
Nonroad
Railroad
Construction (Residential, Commercial, Road, and Site Development)
Permitted Sources
Fuel Combustion (Residential)
Fires (Agricultural, Wildfires, and Prescribed Fires)
Open Burning (Residential, Commercial, and Land Clearing)
Unpaved Parking

5.3.1 Agriculture Crop Emissions

a. Generally

To compute annual emissions within the entire nonattainment area, ADEQ relied on estimates of the annually harvested crop distribution from the 2007 USDA Agricultural Census for major crops within Pinal County. This crop distribution was then scaled to the nonattainment area based on the ratio of crop agricultural lands identified in the PCAQCD/ADEQ land use map for

[75] For more information, see Appendix B (EI TSD) Sections 5.1.7 and 5.2.

the nonattainment area and the total acreage reported harvested in the 2007 USDA Agricultural Census for the County.

Tillage activity emissions were calculated using an AP-42 tillage emission factor equation as used in ADEQ's 2001Agricultural BMP TSD,[76] taking into account local Pinal county silt content and the closest estimate particle size. The emission factor results were then multiplied by the total estimated number of crop-specific acre-passes related to local West Pinal tilling activities.[77]

Harvesting emissions were estimated using crop-specific emission factor equations promulgated by California Air Resources Board, factoring local harvesting activity on each crop specific parcel and respective acreage, per year.[78]

b. Projecting Emissions to 2018

For the 2018 annual inventory, no change was made to the amount of land under cultivation or the methods employed in the 2008 calculations. Agricultural emissions were held constant from 2008 to 2018.[79]

5.3.2 Concentrated Animal Feeding Operations (CAFO) Emissions

a. Generally

Annual PM_{10} emissions generated by CAFOs within the nonattainment area in 2008 were computed using an average daily PM_{10} emission factor;[80] and 2008 animal population averages for affected facilities were provided by representatives of the Arizona Cattle Feeders Association.[81]

b. Factoring growth between 2008 and 2018

While the same method was used as for 2008, the estimates of the cattle population were revised to address the closure of feedlots that have occurred to date. For windblown PM10 emissions estimations, these locations were assumed to transition from the CAFO land use to Cleared Areas. Projected animal populations were supplied by industry contact.82 ADEQ has confirmed through aerial photography and site visits that these facilities no longer exist.

[76] Section 9.1 of AP-42 (U.S. EPA, 1995)
[77] See Appendix B (EI TSD) Section 3.1.1.1 for more information.
[78] *Id*.
[79] See Appendix B (EI TSD) Section 5.1.1 for more information.
[80] This emission factor is further described in Section 3.1.1.2 of Appendix B (EI TSD).
[81] See Appendix B (EI TSD) Sections 3.1.1.2 and 5.1.2.
[82] *Id*.

5.3.3 Dairy Emissions

a. Generally

Annual PM_{10} emissions for dairy operations in the nonattainment area in 2008 were derived from an emission factor published by the Arizona Governor's Agricultural BMP Committee, and estimates of average annual animal populations at affected dairies provided by United Dairymen of Arizona.[83]

b. Factoring growth between 2008 and 2018

The emission estimates employed in the 2008 inventory were held constant for 2018; however, the estimated number of head decreased from 71,624 in 2008 to 70,644 in 2018 due to facility closure.

5.3.4 Fugitive Dust and Exhaust Emissions from Paved Roads

a. Generally

The new AP-42 equation published by EPA in January 2011,[84] a function of silt loading values and the average weight of vehicles traveling on paved roads, was applied to estimate reentrained PM_{10} emissions from paved roads in the nonattainment area. The silt loadings and average vehicle weights were derived from the MAG 2012 Five Percent Plan for PM-10. Paved roads were split into four different silt loading categories, producing four different PM_{10} emission factors from the AP-42 equation. These emission factors were applied to estimated road segment specific vehicle miles traveled (VMT) values to produce 2008 fugitive dust particulate emissions from paved roads for the West Pinal PM_{10} nonattainment area. The estimated 2008 VMT values for the West Pinal PM_{10} nonattainment were obtained from MAG's TransCAD model outputs for the year 2008 in the nonattainment area.[85] For those road segments identified by PCAQCD as containing trackout, the emission factor was increased 381% as described in section 3.1.1.6 of Appendix B. Paved road reentrained fugitive dust was then summed for all road segments in the nonattainment area.

Vehicle exhaust, tire, brake, and starting emissions were calculated using MOVES inventory simulations.[86] Bow wake emissions from large trucks was estimated by applying a Sierra Research developed emission rate formula[87] to roadways identified by the Arizona Department of Transportation (ADOT) as having significant heavy duty vehicle traffic and unpaved road shoulders.

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[83] See Appendix B (EI TSD) Section 5.1.9 for more information.
[84] Section 13.2.1 of AP-42.
[85] See Appendix B (EI TSD) Section 5.1.3 for more information.
[86] *Id*.
[87] "Cost-Effectiveness of Selected PM_{10} Control Measures," prepared for Maricopa Association of Governments by Sierra Research, June 2006, p. 26.

b. Factoring growth between 2008 and 2018

2018 paved road segment VMT values were interpolated from MAG's TransCAD model results for 2015 and 2025.[88] The travel network links and road categories were defined from MAG's 2015 model results.

Road segments identified to contain trackout or produce bow wake emissions in 2008 were also assumed to do so in 2018.

5.3.5 Fugitive Dust and Exhaust Emissions from Unpaved Roads

a. Generally

AP-42 emission factors and guidance were applied to unpaved road VMT values to estimate fugitive PM_{10} emissions.[89] The AP-42 equation takes into account several factors including particle size, surface silt content, mean vehicle speed, surface moisture content, mean vehicle weight, the annual number of wet days, and the annual number of days.

Four categories of unpaved roads have been identified in Pinal County: agricultural, public, private, and trails. Each was determined to have different surface silt and moisture contents, estimated from a Pinal County field study conducted in June 2013. The four categories were additionally split into different classes of roads to account for varying annual average daily traffic (ADT) counts and estimated mean speeds ranging between 15 mph and 47 mph.

ADT is multiplied by total mileage of each respective road to calculate daily VMT. The PM_{10} emission factors were multiplied by the VMT to produce unpaved road emissions for the PM_{10} nonattainment area in 2008.

Unpaved exhaust emission rates were estimated as vehicle-population-weighted average exhaust emission rates for a given unpaved road's estimated average speed bin. Rates were extracted for 2008 using results from the existing Pinal County configured MOVES results.[90]

b. Factoring growth between 2008 and 2018

Except for the unpaved public and private roads, the methods and travel activity employed in the 2008 calculation for the unpaved road emissions (unpaved Ag road, unpaved trails, and test tracks) were held constant for 2018. For unpaved public and private roads, ADTs were assumed to experience growth equivalent to those reported for HPMS data from 2008 to 2013 and equivalent to population projected growth between 2013 and 2018.[91] Additionally, numerous unpaved public road projects were completed or planned between 2008 and the end of 2018.

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[88] *Id*.
[89] AP-42 Section 13.2.2
[90] See Appendix B (EI TSD) Section 5.1.4 for more information.
[91] See Appendix B (EI TSD) Section 3.1.1.4 for more information.

For exhaust emissions, emission rates were extracted for 2018 using results from the existing Pinal County configured MOVES results.[92]

5.3.6 Nonroad Emissions

a. Generally

With the exception of the locomotive and aircraft categories, all nonroad combustion emissions were calculated using Pinal County specific emissions from EPA's NONROAD model. NONROAD calculates emissions as a function of deterioration factors, horsepower, load factor, annual operating hours, and engine unit populations.[93]

The NONROAD model calculates emissions from a varied assortment of equipment sources that are generally categorized. The model calculates emissions utilizing a "top down" approach. Its default equipment populations are based on national averages, which are then scaled down to represent smaller geographic areas (i.e., statewide and countywide) on the basis of human population and other statistics.[94]

b. Factoring growth between 2008 and 2018

Nonroad emissions were calculated for the 2018 calendar year scaling the 2018 equipment population by County population increases over the same period and assuming the emission rate per vehicle will stay constant over this period.[95]

5.3.7 Railroad Emissions

a. Generally

EPA summarized emissions factors for locomotives in a 2009 study.[96] The emission factors are used in calculating the annual railroad emissions by assuming two trains travel through the nonattainment area each hour, 366 days per year.[97]

b. Factoring growth between 2008 and 2018

ADEQ used a forecasted emission factor for locomotives from EPA's 2009 study.[98] All other assumptions for calculating 2018 railroad emission, such as the railroad length and the number of trains per hour, are held the same as 2008.

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[92] *Id*.
[93] See Appendix B (EI TSD) Section 5.1.5 for more information.
[94] See Appendix B (EI TSD) Section 3.1.1.5 for more information.
[95] See Appendix B (EI TSD) Section 5.1.5 for more information
[96] Emission Factors for Locomotives, EPA-420-F-09-025, U.S. Environmental Protection, April 2009.
[97] See Appendix B (EI TSD) Sections 3.1.1.7 and 5.1.6 for more information.
[98] Emission Factors for Locomotives, *supra* note 96 at 8 (Table 6).

5.3.8 Construction Emissions

a. Generally

The location of construction activity and related fugitive dust emissions shifts from year to year. The best source of information for tracking activity within a specific domain and time period is dust control permits and respective types, acreage, and site location. PCAQCD staff[99] reviewed permits issued in late 2007 (4th quarter) and selected those that were most likely to continue into 2008; these were then combined with permits issued in 2008 to create a shape file of polygons identifying the location and acreage of each of the issued permits. ADEQ calculated emission for each construction project by multiplying the number of acres by an annual emission factor that varies by project type and by the average duration for a project type.

b. Factoring growth between 2008 and 2018

The county recorded the number of permits issued in the Pinal County nonattainment area through 2013. The ratio of the number of dust permits issued in 2008 and 2013 was used to project construction emissions from 2008 to 2013. The ratio of projected county population growth between 2013 and 2018 was used to project future construction permitting and ensuing emissions from 2013 to 2018.[100] From 2013-2018, an economic improvement is accounted for by using the projected population growth factor.

5.3.9 Emissions from Permitted Stationary Sources

a. Generally

PM_{10} annual emissions (tons/yr) for each permitted stationary industrial/commercial facility in the nonattainment area were provided by the PCAQCD from permit files. PCAQCD permits include estimates of PM_{10} emissions for stationary sources only. PM_{10} emissions from area sources such as unpaved road travel, livestock movement, and windblown dust were estimated separately and these separate methodologies are discussed in other sections.

b. Factoring growth between 2008 and 2018

The emission estimates calculated for the 2008 inventory were held constant for 2018.

5.3.10 Fuel Combustion Sources

Fuel combustion emissions were estimated for: (1) Fires – including prescribed, wildfires, and agricultural field burning; (2) Residential Fuel Combustion – from fuels including natural gas, oil, wood, and other; and (3) and Open Burning – including residential, commercial and land clearing of debris. In the case where local permit data was available, this information was used

[99] Email from Kate Edwards, Pinal County to Bob Dulla, Sierra Research, 2008 Construction Dust Permits, November 28, 2012.
[100] See Appendix B (EI TSD) Sections 5.1.7 for more information.

for the estimation of combustion emissions in conjunction with EPA approved emission factors. In those instances where local permit data was not available ADEQ and PCAQCD allocated EPA NEI estimates of combustion emissions. Emissions were held constant between 2008 and 2018.[101]

5.3.11 Unpaved Parking

Unpaved parking emission estimates utilized a modified version of the methodologies presented in the 2008 Maricopa County PM_{10} Emission Inventory for reentrainment. Emissions were held constant from 2008 to 2018.[102]

5.4 Comparison of Base Year Inventories to Control Inventories

Table 5-3 Comparing Base Year 2008 to Base Year 2018 to Post Control 2018 Inventories

ADEQ estimated the following emissions reductions based on 2018 assumptions (e.g., that 30 miles of unpaved road controls are in place, implemented in 2016 and 2017). All reductions are presented in tons per year (TPY).		Base 2008 Emissions Inventory (TPY)	Base 2018 Emissions Inventory (TPY)	Attainment 2018 Emissions Inventory (TPY)	Post-contingency 2018 Emissions Inventory (TPY)
Windblown dust	Developed Urban Lands	200.7	248.1	248.1	199.8
	Developed Rural Lands (low density residential)	1959.7	1959.7	1959.7	1899.3
	Unpaved Roads	4688.6	4653.0	3803.1	3793.8
	Cleared Areas	398.1	457.0	457.0	325.8
	Residential Construction	1302.4	837.5	837.5	430.5
	Dairies	449.6	449.6	449.6	384.2
	CAFOs	273.7	155.2	125.3	125.3
	Desert Shrubland	38276.7	38276.7	38276.7	36719.3
	Agriculture	19510.1	19510.1	7122.0	7122.0
	Commercial Construction	686.4	441.4	441.4	216.3
	Other	4243.9	4243.9	4243.9	4242.1
	Site Development	858.7	552.2	552.2	278.9
	Subtotal	72848.6	71784.4	58516.5	55737.3

[101] See Appendix B (EI TSD) Sections 3.1.1.11 and 5.1.10 for more information.
[102] See Appendix B (EI TSD) Sections 3.1.1.9 and 5.1.8 for more information.

Activity-based emissions	Ag Fields - Harvesting	312.9	312.9	207.1	207.1
	Ag Fields - Tilling	2540.3	2540.3	1658.0	1658.0
	CAFOs	2614.3	1620.6	1369.2	1369.2
	Paved Road	1180.7	1408.0	1408.0	1402.3
	Unpaved Road	45127.8	45105.3	37186.4	36053.0
	Fuel Combustion	28.3	34.9	34.9	34.9
	Fires	19.9	22.2	22.2	22.2
	Open Burning	13.6	16.8	16.8	16.8
	Nonroad	121.3	144.4	144.4	144.4
	Railroad	85.9	45.4	45.4	45.4
	Construction	12955.3	8499.8	8499.8	4718.5
	Dairy	186.6	184.0	184.0	148.2
	Permitted Sources	781.3	781.3	781.3	781.3
	Unpaved Parking	251.5	251.5	251.5	172.5
	Subtotal	66219.7	60967.4	51809.0	46773.8
Total		139068.3	132751.8	110325.5	102511.1
Required contingency measures (equal to 1 year of RFP out of 3 total RFP years) =22426.3 · ⅓ =7475.4 TPY					

5.5 Motor Vehicle Emissions Budget (MVEB) Summary

Transportation conformity is required by Section 176(c) of the CAA. Under EPA's transportation conformity regulations, transportation plans and improvement programs must be consistent with, or conform to, the motor vehicle emissions budget (MVEB) defined in the applicable SIP.[103] These budgets specify the level of on-road motor vehicle emissions that are consistent with attainment and maintenance of air quality standards and should include an adequate safety margin.[104]

The budget considers the combined contributions of motor vehicles traveling roads within the nonattainment area, as well as the emissions from construction projects on those roads. Emissions from non-road vehicles are not included in the budget, nor are emissions produced by wind traveling over the roads and construction sites. Emissions from certain commercial roads, which are expected to remain fairly constant from one year to the next, are also omitted. The budget is established for annual emissions totals, and anticipates various changes in traffic, fleet characteristics, road work, and new rules and regulations up through calendar year 2018.

[103] *Conformity Criteria and Procedures: Motor vehicle Emissions Budget*, 40 C.F.R. § 93.118 (2015).

[104] Safety margin means the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance. *Conformity Definitions*, 40 C.F.R. § 93.101 (2015).

From the 2018 attainment inventory, ADEQ developed a comprehensive MVEB for the nonattainment area. See the summary MVEB totals in Table 5-4 below.

Table 5-4 Annual MVEB by Source Sector

Source	Tons of PM10
Exhaust, tire-, & brake-wear	173.7
Unpaved road dust[105]	26,433.5
Reentrained paved road dust	1,211.1
Road construction/maintenance[106]	168.8
Total	**27,987.1**

The emissions total of 27,987.1 tons accounts for more than a quarter of the total attainment inventory; therefore, keeping motor vehicle emissions within this budget is critical to reaching attainment. The budget allows for a small safety margin of 81 tons.

Modeling indicates that the nonattainment area will not violate the 24-hour PM10 national ambient air quality standard (NAAQS) as long as this budget is not exceeded, and as long as the emissions are distributed appropriately, using planning tools such as hotspot analyses to prevent high concentrations of PM10 building up in a given place and time.

ADEQ has consulted Pinal County, Arizona Department of Transportation (ADOT), and Maricopa Association of Governments (MAG) regarding the development of the MVEB for this West Pinal PM_{10} SIP. MAG is the designated metropolitan planning organization (MPO) for Maricopa County and portions of Pinal County, including the City of Apache Junction, the Town of Florence, the City of Maricopa, and some rural portions of Pinal County.[107] MAG is responsible for preparing the Transportation Improvement Program (TIP), Regional Transportation Plan (RTP), and the associated transportation conformity analyses for the above mentioned member agencies. Since 2013, MAG has been conducting the interim emissions test conformity analyses for both the West Pinal PM_{10} and the West Central Pinal $PM_{2.5}$ nonattainment areas as portions of MAG member agencies are located within these areas.

The Sun Corridor MPO, established in 2013, provides transportation planning services to the communities of Casa Grande, Coolidge, Eloy and some rural portions of Pinal County.[108] ADEQ also consulted with the Sun Corridor MPO regarding the MVEB in this West Pinal PM_{10} SIP. Some portions of the West Pinal PM_{10} nonattainment area are located within MAG's

[105] The projected emissions totals for unpaved road dust and construction may be overestimates, since they do not consider the reductions that would be provided by control measures in upcoming Pinal County rules. This omission is intentional; the reductions from the upcoming rules are set aside as contingency measures to counterbalance unforeseen PM10 emissions growth. The additional controls from these rules are expected to increase the budget's safety margin by over 1,000 tons in 2018.
[106] See note 105 above.
[107] Designation of Areas of Air Quality Planning Purposes; State of Arizona, Pinal County PM_{10}, 77 FR 32024, 32030 (May 5, 2012) *available at* http://www.regulations.gov/#!documentDetail;D=EPA-R09-OAR-2010-0491-0063.
[108] SunCorridor Metropolitan Planning Organization, Home, http://scmpo.org/ (last visited Sept. 2, 2015).

jurisdictional boundary, and because Sun Corridor is a new MPO, MAG has agreed to continue preparing the conformity analyses for the entire West Pinal PM_{10} nonattainment area. It is for this reason that ADEQ primarily consulted with MAG and ADOT to review this MVEB. Subject to EPA's approval and finding of adequacy, the MVEB in this West Pinal PM_{10} SIP will be used in future conformity analyses.

For more details regarding MVEB calculations and the relationship between the annual emissions inventory, modeling, and the conformity budget, see Appendix D (Attainment TSD), Section D4.

6 CONTROL MEASURES

The Clean Air Act section 172(c)(1) requires that "[nonattainment plan] provisions shall provide for the implementation of all reasonably available control measures as expeditiously as practicable…and shall provide for attainment of the national primary ambient air quality standards." In reviewing a statute, regulation or rule for SIP approval, EPA looks to ensure that the provision is enforceable as required by CAA section 110(a) and is consistent with all applicable EPA guidance.

CAA section 172(c)(9) requires that the 189(a) plan provide for the implementation of contingency measures, which are to be undertaken if the area fails to make RFP or to attain the PM-10 standard as projected in the plan. Such measures shall take effect without further action, such as public hearings or legislative review, by the state or EPA. EPA has interpreted section 172(c)(9) to allow states to implement contingency measures before they are triggered by a failure of RFP or attainment as long as those measures are intended to achieve reductions over and beyond those relied on in the attainment and RFP demonstrations.[109] The CAA does not specify how many contingency measures are necessary nor does it specify the level of emission reductions they must produce.

ADEQ believes that the submitted (or soon to be submitted) control measures qualify as reasonably available control measures (RACM). For a full RACM discussion, see Appendix F. ADEQ has also projected attainment by the required date, which is the end of December 2018, and the efficacy of chosen contingency measures to ensure RFP past the attainment date. The contingency measures will take effect presently to avoid any necessary future further action by the state or the EPA. Pinal County's general fugitive and construction rules are now final rules, effective in January 2016. ADEQ's and Pinal County's chosen control measures to meet attainment and contingency measure requirements are described below.

6.1 Agricultural Rule – Attainment and Contingency in Part

6.1.1 Commercial Farms Summary (R18-2-610 and -610.03)

The commercial farms rule was credited towards attainment. The rule requires new controls for commercial farmers in the Pinal County PM Nonattainment Area, as defined in R18-2-610 (37). Commercial farmers in that area are required to implement one Best Management Practice (BMP) every day of the year from the tillage, ground operations and harvest, commercial farm roads, noncropland, and significant earth moving categories, and two BMPs

[109] *See* Proposed Approval of Maricopa County Serious Nonattainment Area Plan, 75 FR 54806, 54815 (Sept. 9, 2010). *See generally*, LEAN v. EPA, 382 F.3d 575 (5th Cir. 2004). See also General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 57 Fed. Reg. 13,498, at 13512.

from the cropland category. On the day before and during a day (or, depending on the BMP, just the day) forecast to be high risk for dust generation, as determined by the dust control forecast (R18-2-610 (18)), a commercial farmer is required to ensure implementation of one BMP that is in the high risk category for tillage, ground operations and harvest, cropland, commercial farm roads, and noncropland. If a commercial farmer implements conservation tillage or a reduced tillage system for the tillage category on a crop, he/she does not have to implement a BMP for ground operations, harvest, or cropland for that crop acreage, whether or not a day is forecasted to be high risk.

6.1.2 Appendix 2 – Test Method for Silt Loading

Appendix 2 is also submitted into the Arizona SIP. It will be used to determine compliance with sections requiring the use of a silt test method in the commercial farms rule.

6.1.3 Commercial Animal Operations Summary (R18-2-611 and -611.03)

Generally, the animal operations rules are credited towards attainment, except for those animal operations not yet existing in the nonattainment area (e.g. poultry and swine operations). However, the section applicable to commercial dairy operations was credited toward contingency measures,

The rule requires new controls for commercial animal operators in the Pinal County PM Nonattainment Area defined in R18-2-611(1)(i). Commercial animal operators are required to implement one BMP every day of the year from the arenas, corrals and pens, animal waste (and feed) handling and transporting, unpaved access connections and unpaved roads or feed lanes categories. For beef cattle feedlots, in addition to selecting one BMP from each category, on the day that is forecast to be high risk for dust generation, as determined by the dust control forecast, must add water to pen surface, as defined in R18-2-611(3)(a).

For commercial dairy operation, in addition to selecting one BMP from each category, on the day that is forecast to be high risk for dust generation, as determined by the dust control forecast, must apply and maintain one of the four following BMPs on unpaved roads that experience more than 20 VDT from 2 or more axle vehicles:

1. Apply and maintain pavement in high traffic areas,
2. Apply and maintain aggregate cover,
3. Apply and maintain synthetic particulate suppressant, or
4. Apply and maintain water as a dust suppressant.

6.1.4 Irrigation Districts in the Pinal County PM Nonattainment Area (R18-2-612 and -612.01)

Rule R18-2-612 was renumbered and rule R18-2-612.01 was added in order to provide definitions and BMPs for irrigation districts only within the Pinal County PM Nonattainment area. Senate Bill 1408 (Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1) adds the activities of irrigation districts in regulated areas established after June 1, 2009. This rule adds requirements for irrigation districts to implement one BMP from the unpaved operation and maintenance roads, canals, and unpaved utility access roads categories. No credit was taken for access road provisions, but attainment credit was taken for operation and maintenance irrigation roads.

6.1.5 Implementation Schedule – Agricultural Rules

The Arizona Administrative Code Agricultural Rules were effective upon filing with the Arizona Secretary of State, as of July 2, 2015.

The rules must be complied with beginning January 1, 2016. The rules mandate that by December 31, 2015, agricultural sources engaged in regulated agricultural activity must complete a BMP Program General Permit Record Form, and must complete such form every year thereafter by March 31.

6.1.6 Enforceability

6.1.6.1 Commercial Farms

6.1.6.1.1 Authority

The Agricultural BMP Committee has the statutory authority to adopt the Agricultural BMP commercial farm rules under A.R.S. § 49-457(H). Under A.R.S. §§ 49-457(I), (J), and (K), ADEQ has the statutory authority to enforce a regulated person's compliance with the rules and general permit program. ADEQ has additional enforcement authority under A.R.S. §§ 49-460, -461, -462, -463, and -464, which ADEQ will resort to if measures taken under A.R.S. §§ 49-457(I), (J), and (K) are unsuccessful to return a facility to compliance.

6.1.6.1.2 Applicability

The crop operations rules apply to commercial farmers who engage in regulated agricultural activity in the Pinal County PM Nonattainment Area. A commercial farmer is an individual, entity, or joint operation in general control of more than 10 or more contiguous acres of land used for agricultural purposes. "Regulated activity" upon such farms would be those activities or sources statutorily defined in A.R.S. § 49-457(P), consisting of tilling, harvesting (including ground operations), and those areas of a commercial farm that are not normally in crop production (such as commercial farm roads and noncropland as defined in the submitted rule), those areas that are normally in crop production including prior to plan emergence and when

the land is not in crop production (covering cropland as defined in the submitted rule), and earthmoving activities.

6.1.6.1.3 Exemptions

Exemptions from the rule's requirements only apply to farmers who choose to implement conservation tillage or reduced tillage system BMPs for the tillage category. If farmers choose either of these BMPs for the tillage category, they do not have to implement BMPs for ground operations and harvest on either a regular or high risk day, nor would they have to implement BMPs on cropland on either a regular or a high risk day. These exemptions exist because both BMPs, conservation tillage and reduced tillage systems, have control efficiencies which temporally affect other regulated activities or sources during multiple planting phases. Both BMPs can provide adequate control against tillage emissions and either leave plant stubble protruding from the ground or leave plant material laying on the field's surface, providing control of windblown dust year-round.

6.1.6.1.4 Alternative Practices

A farmer may develop different practices to choose as BMPs to control PM emissions, but such practices will not be effective until they are submitted as a SIP revision to the EPA per A.R.S. § 49-457(L). Additionally, as provided by A.A.C. R18-2-610.03(E), any alternative practices must be "proven effective through on-operation demonstration trials to the Committee." The already statutorily stated purpose of BMPs is to reduce PM_{10} emissions.[110] Therefore, before submittal, these alternative practices would be thoroughly evaluated on a case-by-case basis by the Agricultural BMP Committee, and ADEQ would provide technical input as needed, and any other advice, as needed, to ensure the newly developed practice is sufficiently effective to control PM10.

6.1.6.1.5 Notice

The definitions and rule requirements are sufficiently clear so as to put the regulated public on notice. Where needed, many definitions rely on specific test methods and are extremely detailed. ADEQ and the Agricultural BMP have worked together to ensure that the rule is clear and understandable. The West Pinal County applicable commercial farms rule is more comprehensive and specific than the previous Maricopa rule, which has been in place for several years, in its current and modified forms.[111]

As far as outreach is concerned, the Agricultural BMP statute that establishes the Agricultural BMP Committee requires the Committee to develop and commence an education program.[112] The Agricultural BMP Committee has been working fervently to develop a program for the Pinal nonattainment area community. The outreach developed thus far is very thorough and

[110] A.R.S. § 49-457(H) (2015).
[111] *See generally*, Approval and Promulgation of Maricopa PM-10 Arizona Implementation Plan, 66 FR 51869 (Oct. 11, 2001).
[112] A.R.S. § 49-457(M) (2015).

informative. The Committee has created a guidebook, specific to this rule, to help the regulated public understand the new standards. There will be information disseminated, also, explaining how to sign up for the high risk forecast, which is critical to the rule's effectiveness and penetration. The Committee intends to supply these extensive informational guidebooks at several outreach meetings over the course of the months between October 2015 and January 2016, to ensure compliance with the rule by the compliance date. The meetings will be held within the nonattainment area where the Committee will explain the importance of complying with the rule. Additionally, the Committee, ADEQ, and the Department of Agriculture are working diligently to develop a comprehensive 3-year survey as required by the rule.

6.1.6.1.6 Compliance Schedule

As previously stated, per the Agricultural BMP statute as revised, A.R.S. § 49-457, "[a] person who commences a regulated agricultural activity shall immediately comply with the agricultural general permit [prescribed by the statute]." Immediate compliance, in this case, would be after December 31, 2015, beginning January 1, 2016, as required by the commercial farm rule.

6.1.6.1.7 Records

A General Permit Record Form must be filled out and kept as a record onsite and made available for review within two business days of notice. The requirements for the record form are listed in A.A.C. R18-2-610.03(C), and shall include notation, of the categorical best management practices a farmer has chosen to apply a regulation basis and on high risk days, as applicable. Such form shall also include a notation of any changes. The purpose of the record form is to assist inspectors with enforcement and to hold facilities accountable for their BMPs chosen.

Beginning January 1, 2016, a commercial farmer must maintain records demonstrating compliance with the rules for three years, including a copy of the BMP Program General Permit Record Form. Additionally, by January 31, 2018, farmers must submit their first BMP 3-Year Survey which reflects the BMPs chosen in the previous calendar year. The next due date after January 31, 2018, will be January 31, 2021 (reporting on 2020), and every three years thereafter. The required information is listed in A.A.C. R18-2-610.03(D), and will ensure that facilities are held accountable for the required BMPs and will also provide ADEQ with the necessary information for future emissions calculations.

6.1.6.1.8 Test Methods and Compliance

Compliance is determined by inspection and records review. ADEQ will enforce the rule as necessary and as authorized, but its primary goal will be to ensure ADEQ takes advantage of every opportunity to provide compliance assistance to prevent any violations. Preventing violations is the most effective form of protection of human health and the environment. The agricultural community is very close-knit in Arizona and has complex needs. Inspectors are linked by cell phone to instant monitor alerts, even in the middle of the night. ADEQ's compliance section is extremely responsive to such alerts and any complaints. ADEQ responds to such alerts and complaints with contact and/or an inspection of the problem area, in

addition to regular monthly inspections of various agricultural facilities according to internal goals.

Test methods include those listed in Table 6-1 below.

Table 6-1 Commercial Farms Rule Test Methods

Test Method	Location in the rule and purpose
NRCS Practice Code 609, Surface Roughening, amended through November 2008.	R18-2-610 (53), in the definition of "surface roughening," to ensure the soil surface is manipulated to produce clods on the land surface, if implementing the BMP on cropland
NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011.	R18-2-610 (14), in the definition of "cover crop," to ensure the vegetation meets the minimum ground cover requirement of 60%, if implementing the BMP on cropland R18-2-610 (15), in the definition of "critical area planting," to ensure 60% required ground cover if implementing the BMP on noncropland R18-2-610 (36), in the definition of "permanent cover," to ensure perennial species are used to meet minimum requirements of 60% ground cover if implementing the BMP on cropland R18-2-610 (47), in the definition for "residue management," to ensure a minimum of 60% ground cover of crop or other plant residues between harvest and tillage, if choosing the BMP to control cropland
NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998.	R18-2-610 (39), in the definition of "planting based on soil moisture," to ensure the appropriate amount of moisture to germinate seeds prior to planting, implementing the BMP for tillage R18-2-610 (56), in the definition for "tillage based on soil moisture," to ensure fields have the minimum required soil moisture content from irrigation or precipitation prior to soil disturbance, If implementing the BMP for tillage R18-2-610.03 (B)(6), as the method for determining appropriate soil moisture for the applicable earthmoving activity BMPs
NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended	R18-2-610 (65), in the definition for "wind barrier," to ensure a vegetative wind barrier is sufficiently

Test Method	Location in the rule and purpose
through August 21, 2009	sufficient to change the pattern of air flow over the land surface to control PM emissions, if choosing this BMP for noncropland, commercial farm roads (high risk days), or cropland
Silt Content Test Method	Appendix 2, Subsection (N), incorporated into R18-2-610 (51),

6.1.6.2 CAFOs

6.1.6.2.1 Authority

The Agricultural BMP Committee has the statutory authority to adopt the Agricultural BMP crops rules under A.R.S. § 49-457(H). Under A.R.S. §§ 49-457(I), (J), and (K), ADEQ has the statutory authority to enforce a regulated person's compliance with the rules and general permit program. ADEQ has additional enforcement authority under A.R.S. §§ 49-460, -461, -462, -463, and -464, which ADEQ will resort to if measures taken under A.R.S. §§ 49-457(I), (J), and (K) are unsuccessful to return a facility to compliance.

6.1.6.2.2 Rule Applicability

The animal operations rules apply to commercial animal operators who engage in regulated agricultural activity in the Pinal County PM Nonattainment Area. A commercial farmer is an individual, entity, or joint operation in general control of a:

1. commercial dairy operation with more than 150 dairy cattle with the nonattainment boundary,
2. commercial beef feedlot with more than 500 beef cattle within the nonattainment boundary,
3. commercial poultry facility with more than 25,000 egg laying hens within the nonattainment area, and/or
4. commercial swine facility with more than 50 animal units for more than 30 consecutive days within the nonattainment area.

"Regulated activity" upon such operations would be those activities or sources statutorily defined in A.R.S. § 49-457(P), consisting of earthmoving activities and one of the categorical CAFO practices related to: unpaved access connections, unpaved roads or feed lanes, animal waste handling and transporting, arenas, corrals, and pens.

6.1.6.2.3 Exemptions or Additional Requirements

Those operations or operator exempted from this rule are those that fall outside of the applicable animal population thresholds listed above. There are more specific requirements, however, for some animal operations on high risk days. On a high risk day, commercial dairy operations within Pinal County shall apply and maintain one of the listed BMPs on unpaved roads that experience more than 20 vehicle trips per day from two or more axle vehicles. Beef feedlots must also add three to six gallons of water per head of cattle per day to cattle occupied pen surfaces.

6.1.6.2.4 Alternative Practices

An operator may develop different practices to choose as BMPs to control PM emissions, but such practices will not be effective until they are submitted as a SIP revision to the EPA per A.R.S. § 49-457(L). As provided by A.A.C. R18-2-611.03(K), any alternative practices must be "proven effective through on-operation demonstration trials to the Committee." The already statutorily stated purpose of BMPs is to reduce PM_{10} emissions. Therefore, before submittal, any alternative practices would be thoroughly evaluated on a case-by-case basis by the Agricultural BMP Committee, and ADEQ would provide technical input and any other advice, as needed, to ensure the newly developed practice is sufficiently effective to control PM_{10}.

6.1.6.2.5 Notice

The definitions and rule requirements are sufficiently clear so as to put the regulated public on notice. Where needed, many definitions rely on specific test methods and are extremely detailed. ADEQ and the Agricultural BMP Committee have worked together to ensure that the rule is clear and understandable. The West Pinal County applicable commercial farms rule is more comprehensive and specific than the previous Maricopa rule, which has been in place for several years in its current and modified forms.[113]

As far as outreach is concerned, the Agricultural BMP statute that establishes the Agricultural BMP Committee requires the Committee to develop and commence an education program.[114] The Agricultural BMP Committee has been working fervently to develop a program for the Pinal nonattainment area community. The outreach developed thus far is very thorough and informative. The Committee has created a guidebook, specific to this rule, to help the regulated public understand the new standards. There will likely be information in the guidebook, also, explaining how to sign up for the high risk forecast, which is critical to the rule's effectiveness. The Committee intends to supply these extensive informational guidebooks to the regulated public to ensure compliance with the rule by the compliance date. Additionally, the Committee, ADEQ, and the Department of Agriculture have been working to develop a comprehensive 3-year survey for each animal operations type, as required by the rule.

6.1.6.2.6 Compliance Schedule

As previously stated, per the Agricultural BMP statute as revised, A.R.S. § 49-457, "[a] person who commences a regulated agricultural activity shall immediately comply with the agricultural general permit [prescribed by the statute]." Immediate compliance, in this case, would be after December 31, 2015, beginning January 1, 2016, as required by the animal operations rule.

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[113] *See generally*, Approval and Promulgation of Maricopa PM-10 Arizona Implementation Plan, 66 FR 51869 (Oct. 11, 2001).
[114] A.R.S. § 49-457(M) (2015).

6.1.6.2.7 Records

A General Permit Record Form must be filled out and kept as a record onsite and made available for review within two business days of notice. The requirements for the record form are listed in A.A.C. R18-2-611.03(H), and shall include notation of the categorical BMPs an animal operator has chosen to apply on a regular basis and on high risk days, as applicable. Such form shall also include a notation of any changes. The purpose of the record form is to assist inspectors with enforcement and to hold facilities accountable for their BMPs chosen.

Beginning in January 1, 2016, a commercial animal operator must maintain records demonstrating compliance with the rules for three years, including a copy of the BMP Program General Permit Record Form. Additionally, by January 31, 2018, operators must submit their first BMP 3-Year Survey which reflects the BMPs chosen in the previous calendar year. The next due date after January 31, 2018, will be January 31, 2021 (reporting on 2020), and every three years thereafter. The required information is listed in A.A.C. R18-2-611.03(I), and will ensure that facilities are held accountable for the required BMPs and will ensure that facilities are held accountable for the required BMPs and will also provide ADEQ with the necessary information for future emissions calculations.

6.1.6.2.8 Test methods and Compliance

Compliance is determined by inspection and records review. ADEQ will enforce the rule as necessary and as authorized, but its primary goal will be to ensure ADEQ takes advantage of every opportunity to provide compliance assistance to prevent any violations. Preventing violations is the most effective form of protection of human health and the environment. The agricultural community is very close-knit in Arizona and has complex needs. Inspectors are linked by cell phone to instant monitor alerts, even in the middle of the night. ADEQ's compliance section is extremely responsive to such alerts and any complaints. ADEQ responds to such alerts and complaints with contact and/or an inspection of the problem area, in addition to regular monthly inspections of various agricultural facilities according to internal goals.

Test methods are listed in Table 6-2 below.

Table 6-2 CAFO Rule Test Methods

Test Method	Location in the rule and purpose
NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009	R18-2-611 (2)(x) or (3)(r), the equivalent definitions for "wind barrier," to ensure a vegetative wind barrier is sufficiently sufficient to change the pattern of air flow over the land surface to control PM emissions, if choosing this BMP for control of arenas, corrals, and pens, at a dairy operation of a commercial beef lot control, or to control unpaved roads or feed lanes at swine operations,

6.1.6.3 Irrigation Districts

6.1.6.3.1 Authority

The Agricultural BMP Committee has the statutory authority to adopt the Agricultural BMP crops rules under A.R.S. § 49-457(H). Under A.R.S. §§ 49-457(I), (J), and (K), ADEQ has the statutory authority to enforce a regulated person's compliance with the rules and general permit program. ADEQ has additional enforcement authority under A.R.S. §§ 49-460, -461, -462, -463, and -464, which ADEQ will resort to if measures taken under A.R.S. §§ 49-457(I), (J), and (K) are unsuccessful to return a facility to compliance.

6.1.6.3.2 Rule Applicability

The irrigation district rules apply to irrigation districts within a PM Nonattainment Area designated after June 1, 2009 (including the West Pinal Nonattainment area), that engage in regulated agricultural activity in the Pinal County PM Nonattainment Area. An irrigation district is a political subdivision governed by A.R.S. Title 48, Chapter 19, Irrigation and Water Conservation Districts, and per A.R.S. § 48-2901, all such subdivisions are declared municipal corporations for all purposes.

"Regulated activity" by such districts would be regulating those activities or impact of sources as statutorily defined in A.R.S. § 49-457(P), which are only under the jurisdiction and control of the district, including regulating practices related to unpaved operation and maintenance roads, canals, and unpaved utility access roads.

6.1.6.3.3 Exemptions or Additional Requirements

Those operations or operator exempted from this rule are those that fall outside of the applicable requirements, including jurisdiction, listed above. There are no additional requirements on high risk days.

6.1.6.3.4 Alternative Practices

A district may develop different practices to choose as BMPs to control PM emissions, but such practices will not be effective until they are submitted as a SIP revision to the EPA per A.R.S. § 49-457(L). As provided by A.A.C. R18-2-612.01(E), any alternative practices must be "proven effective through on-operation demonstration trials to the Committee." The already statutorily stated purpose of BMPs is to reduce PM-10 emissions. Therefore, before submittal, any alternative practices would be thoroughly evaluated on a case-by-case basis by the Agricultural BMP Committee, and ADEQ would provide technical input and any other advice, as needed, to ensure the newly developed practice is sufficiently effective to control PM10.

6.1.6.3.5 Notice

The definitions and rule requirements are sufficiently clear so as to put the regulated public on notice. Where needed, many definitions rely on specific test methods and are extremely

detailed. ADEQ and the Agricultural BMP have worked together to ensure that the rule is clear and understandable.

6.1.6.3.6 Compliance Schedule

As previously stated, per the Agricultural BMP statute as revised, A.R.S. § 49-457, "[a] person who commences a regulated agricultural activity shall immediately comply with the agricultural general permit [prescribed by the statute]." Immediate compliance, in this case, would be after December 31, 2015, beginning January 1, 2016, as required by the irrigation districts rule.

6.1.6.3.7 Records

A General Permit Record Form must be filled out and kept as a record onsite and made available for review within two business days of notice. The requirements for the record form are listed in A.A.C. R18-2-611.03(H), and shall include notation of the categorical BMPs an irrigation district has chosen to apply on a regular basis. Such form shall also include a notation of any changes. The purpose of the record form is to assist inspectors with enforcement and to hold facilities accountable for their BMPs chosen.

Beginning January 1, 2016, an irrigation district must maintain records demonstrating compliance with the rules for three years, including a copy of the BMP Program General Permit Record Form. Additionally, by January 31, 2018, districts must submit their first BMP 3-Year Survey which reflects the BMPs chosen in the previous calendar year. The next due date after January 31, 2018, will be January 31, 2021 (reporting on 2020), and every three years thereafter. The required information is listed in A.A.C. R18-2-611.03(I), and will ensure that districts are held accountable for the required BMPs and will also provide ADEQ with the necessary information for future emissions calculations.

6.1.6.3.8 Test methods and Compliance

Compliance is determined by inspection and records review. ADEQ will enforce the rule as necessary and as authorized, but its primary goal will be to ensure ADEQ takes advantage of every opportunity to provide compliance assistance to prevent any violations. Preventing violations is the most effective form of protection of human health and the environment. The agricultural community is very close-knit in Arizona and has complex needs. Inspectors are linked by cell phone to instant monitor alerts, even in the middle of the night. ADEQ's compliance section is extremely responsive to such alerts and any complaints. ADEQ responds to such alerts and complaints with contact and/or an inspection of the problem area, in addition to regular monthly inspections of various agricultural facilities according to internal goals.

Applicable test methods are listed in Table 6-3 below.

Table 6-3 Irrigation Districts Rule Test Methods

Test Method	Location in the rule and purpose
NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended	R18-2-612 (33), in the definition for "wind barrier," to ensure that the vegetative barrier is

through August 21, 2009	sufficient to change the pattern of air flow over the land surface to control PM emissions

6.1.7 Credited Annual Emission Reductions from Agricultural BMP Rules

Table 6-4 Agricultural Best Management Practices Rule Reductions (Attainment and Contingency)

		Attainment				Contingency	
		Unpaved crop farm roads	Unpaved canal O&M roads	Harvesting and Tilling	CAFOs	Dairies	*AgBMP Rule Subtotal*
Windblown dust	Unpaved Roads	705.2	144.7				*849.9*
	Dairies (including unpaved roads)					65.4	*65.4*
	CAFOs (including unpaved roads)				29.9		*29.9*
	Agriculture			12,388.1			*12,388.1*
	Subtotal	705.2	144.7	12,388.1	29.9	65.4	*13,333.3*
Activity-based emissions	Ag Fields - Harvesting			105.8			*105.8*
	Ag Fields - Tilling			882.3			*882.3*
	CAFOs				251.4		*251.4*
	Unpaved Road	7,341.3	577.6				*7,918.8*
	Dairy					35.8	*35.8*
	Subtotal	7,341.3	577.6	988.1	251.4	35.8	*9,194.2*
Total		8,046.5	722.3	13,376.2	281.3	101.2	*22,527.5*

6.2 Fugitive dust – Contingency Measure

6.2.1 Fugitive Dust Rule Summary

This rule is a general area source control rule, not permit based. Owners and/or operators of several source types are subject to implement required PM10 control measures on applicable sources to meet visible emissions and stabilization requirements, in order to reduce PM emissions in the West Pinal Nonattainment Area. Open areas/vacant lots of a particular threshold must be stabilized to 20% opacity for fugitive emissions on the property, and owners/operators must install and maintain trespassing signs or physical barriers if trespass occurs on the property. Within 30 days following the discovery of the threshold disturbed surface area, the owner/operator shall sign up to receive ADEQ's Pinal County Dust Control Forecast (i.e. high risk forecast) and shall ensure the lot is stabilized the day leading up to and the day of high risk forecast. Unpaved lots of a particular size threshold must be controlled to meet opacity and stabilization requirements. Unpaved roads above 150 Average Daily Trips (ADT) are subject to specific opacity and stabilization (silt loading/content) standards, and owners/operators must incrementally control a specific length of such unpaved roads. Paved public roadways are subject to trackout clean up and taking stabilization actions before, during and after work on unpaved road shoulders along paved public roadways.

6.2.2 Planned Rule Implementation Schedule – General Fugitive Dust Rule

The Pinal County Air Quality Control District filed the rule with the Secretary of State. The rule was published in the Arizona Administrative Register as a final rule, effective January 1, 2016.[115] The hearing/Board of Supervisors meeting took place on October 28, 2015. Pinal County provided ADEQ with its rulemaking documentation to submit to the EPA.[116]

6.2.3 Enforceability

6.2.3.1 Authority

Per A.R.S. 49-479(A), the Pinal 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 Pinal County territorial limits. Pinal 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 construction permit, therefore the permit and authorizing rule

[115] *See* Appendix I; *see also* Exhibit G-VIII.
[116] *See* Appendix I.

are more stringent than ADEQ's rules. However, this rule is federally required per C.A.A. §189, insofar as to ensure that ADEQ is able to submit a SIP on behalf of Pinal County for the West Pinal County moderate nonattainment area, and that there are rules in place to control PM emissions for a significant dust generating sources of general fugitive dust, particularly unpaved roads.

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

6.2.3.2 Rule Applicability

The Fugitive Dust rule applies to owners/or operators of dust emitting sources such as open areas/vacant lots, unpaved roads, unpaved lots, and paved public roadways to control PM emissions from such sources located within the West Pinal Nonattainment Area and activities upon such sources. Regulated sources requiring control measures are those above applicable thresholds as follows:

1. open areas, public or private, of 1.0 acre or larger that have 0.5 acres or more of disturbed surface area
2. unpaved lots 5,000 ft^2 or larger in size
3. unpaved public roads with 150 Average Daily Trips (ADT)
4. paved public roadways with trackout that extends 50 feet or more
5. paved public roadway shoulders

6.2.3.3 Exemptions or Additional Requirements

Anything below the thresholds listed above is not subject to stabilization or control requirements under this rule.

6.2.3.4 Alternative Practices

Alternative measures that are adequate to address a work site's applicable standards in PCAQCD Code § 4-3-180 must be approved by PCAQCD and the EPA Administrator.

6.2.3.5 Notice

The definitions and rule requirements are sufficiently clear so as to put the regulated public on notice. Pinal County has worked closely with industry representatives to ensure the rule is understandable and clear so that the regulated can comply with it. Regulated government entities (owners/operators of several public roads), Pinal County, and ADEQ have consulted with one another to ensure understanding of the rule as written. Pinal County and ADEQ also intend to conduct outreach to ensure the regulated public is informed of the rule, its requirements, and how to sign up for the high risk forecast. Where needed, the rule relies on specific test methods to ensure compliance.

6.2.3.6 Compliance Schedule

Per the language of the rule, it will be effective as of January 1, 2016. From that point on, the regulated community must comply with the rule.

6.2.3.7 Records

Any person subject to the Fugitive Dust rule shall compile and retain records that provide evidence of control application. Upon notice, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours to Pinal County. Additionally, each city, county, or state agency with primary responsibility for existing paved public roadways and unpaved roads shall provide the Pinal County with a list of all unpaved roads, including data of the length of and ADT on, unpaved roadways in its jurisdiction by January 30th of each year. Additionally, by January 30 of each year, each entity as previously described shall submit to the District a list of unpaved roads paved within the previous year, along with their respective ADTs and mileage. Copies of records and reporting shall be retained for at least two years.

6.2.3.8 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 Pinal County's authority to enforce, as listed above. In particular, in the case that any owner and/or operator of unpaved roads with ADT greater than 150 do not comply with applicable requirements, including paving, applying dust suppressants other than water, or applying gravel on 15 miles of roads above 150 ADT (or the equivalent from 2019 and beyond), each owner/operator shall be subject to enforcement. All owners/operators shall be held jointly and severally liable, regardless of the efforts made by one entity over others. For example, if Entity A paves 14 miles in one year, but none of the other owners/operators apply (and maintain, if necessary) any of the listed control measures for the same year, then all owners/operators, including Entity A, are subject to enforcement. All parties in that case would be held responsible for the road control deficiency violation. It is up to all the owners/operators within the West Pinal Nonattainment area to demonstrate compliance with this rule.

As a practical matter, the stabilization of unpaved roads in the West Pinal PM10 Nonattainment Area is coordinated between several entities including Pinal County Public Works; the Sun Corridor MPO and member cities and towns including Casa Grande, Eloy, Coolidge, and Pinal County; Maricopa Association of Governments and member city and towns including Maricopa and Queen Creek, and Pinal County. Coordination efforts are achieved through regular MPO meetings, development of transportation improvement plans (TIP's) incorporating additional stabilization requirements, and interagency coordination with respect to planning and budgetary needs.

Applicable test methods are listed in Table 6-5 below.

Table 6-5 General Fugitive Dust Rule Test Methods

Test Method	Location in the rule and purpose
Opacity (as applicable from PCAQCD code §4-9-340)	§ 4-1-130.2.A, and 3.A.i, 4.A.i, and 5.A.i.ii, in the control requirements for measuring fugitive dust from the applicable open areas/vacant lots, unpaved lots, unpaved roads, and paved public roads, respectively, by measuring and ensuring opacity is below 20%
Visible Crust Determination [The Drop Ball Test] as defined in PCAQCD Code § 4-9-329.B.1	§ 4-1-130.2.F.i, to ensure control measures implemented ensure surface crusting is resistant to wind-driven fugitive dust
Threshold Friction Velocity as determined by test method in PCAQCD Code § 4-9-320.B.2	§ 4-1-130.2.F.ii, to determine the threshold friction velocity of disturbed surface areas that are not crusted or vegetated
NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009Determination of Flat Vegetative Cover, PCAQCD Code §4-9-320.B.3	R18-§ 4-1-130.2-612 (33), in the definition for "wind barrier,".F.iii, to ensure that the flat vegetative barrier is sufficient to change the pattern of air flow over the land cover (rooted or unattached vegetative debris lying on the surface with a predominant horizontal orientation that is not subject to movement by wind) equals at least 50% to meet the applicable control PM emission control measure requirement
Determination of Standing Vegetative Cover, PCAQCD Code §4-9-320.B.4	§ 4-1-130.2.F.iii and F.iv, to ensure the standing vegetative cover (rooted vegetation with a predominant vertical orientation)meets minimum percent coverage requirements, depending on the control measure and applicable threshold friction velocity
Silt Content Test Method for Unpaved Roads and Unpaved Parking Lots, in PCAQCD Code § 4-9-320.A.1	§ 4-1-130.3.A.i, and 4.A.i, to test whether silt loading is equal to or greater than 0.33 oz/ft^2 on unpaved lots and unpaved roads, respectively, and if equal or greater, to evaluate the percent silt content

6.2.4 Credited Annual Emissions Reductions from Fugitive Dust Rule

Table 6-6 Fugitive Dust Rule Attributable Annual Inventory Reductions (TPY) [117]

		Vacant lots and open areas	Unpaved lots	Unpaved public roads	Paved road shoulders	*Fugitive Dust Rule Subtotal*
Windblown dust emissions	Developed Urban Lands	33.8	14.1		0.5	*48.4*
	Developed Rural Lands (low density residential)	25.6	33.6		1.2	*60.4*
	Unpaved Roads			9.4		*9.4*
	Cleared Areas	114.4	16.7		0.1	*131.2*
	Desert Shrubland	1,554.2			3.2	*1,557.4*
	Other				1.8	*1.8*
		1,727.9	64.4	7.1	6.8	*1,808.5*
Activity-based emissions	Paved Road				0.8	*0.8*
	Unpaved Road			1,033.3		*1,033.3*
	Unpaved Parking		79.1			*79.1*
	Subtotal		79.1	1,133.3	0.8	*1,213.2*
		1,727.9	143.4	1,142.7	7.6	*3021.7*

[117] This chart does not reflect the actual reductions in trackout emissions from the fugitive dust rule. In the construction rule's credited reductions, the reductions from trackout rule provisions actually reflect reductions from a combination of both the construction and fugitive rules. The creditable emissions were never numerically separated to attribute the respective reductions to each rule.

6.3 Construction Rule - Contingency

6.3.1 Construction Rule Summary

The Pinal County Fugitive Dust Construction Rule (Construction Rule) is a permit based program. Prior to engaging in any dust generating operations an owner and/or operator shall file a dust generating application and receive a signed permit from Pinal County. Different requirements apply depending on the size of the work site. All works sites must at least meet a 20% opacity standard for dust generating operations and ensure stabilization using all applicable control measures, including watering before and during operations, applying chemical dust suppressants, altering load-in/load-out procedures and watering, reducing vehicular speeds, controlling freeboard and spillage and covering haul vehicles, trackout control device, limiting, restricting or rerouting motor vehicles and other measures.

6.3.2 Planned Rule Implementation

The Pinal County Air Quality Control District filed the rule with the Arizona Secretary of State. The hearing/Board of Supervisors meeting to adopt the rule took place on October 28, 2015. The rule was published in the Arizona Administrative Register as a final rule, effective January 1, 2016.[118] Pinal County provided ADEQ with its rulemaking documentation to submit to the EPA.[119]

6.3.3 Enforceability

6.3.3.1 Authority

Per A.R.S. 49-479(A), the Pinal 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 Pinal County territorial limits. Pinal County may adopt a rule that is more stringent than ADEQ's as long as certain conditions are met. Such conditions include that 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 construction permit. Therefore, the permit and authorizing rule are more stringent than ADEQ's rules. However, this rule is federally required per C.A.A. §189, insofar as to ensure that ADEQ is able to submit a SIP on behalf of Pinal County for the West Pinal County moderate nonattainment area, and that there are rules in place to control PM emissions for a significant dust generating source such as construction work sites and associated activity.

[118] *See* Appendix H; *see also* Exhibit G-VII.
[119] *See* Appendix H.

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

6.3.3.2 Rule Applicability

Pinal County's West Pinal PM10 Nonattainment Area Construction Fugitive Dust rule applies to construction activities generating fugitive dust in the West Pinal PM10 nonattainment area. Construction, as used in the rule, means building, maintaining, or modifying a capital improvement resting upon, connected to, or buried in the earth.

Different requirements apply to different sized work sites. Work sites 0.1 acres or larger must meet a 20% opacity standard and stabilization requirement. Work sites 5 acres or larger must install a trackout device, erect signs or barriers to limit trespass in areas where dust generating operations have ceased for more than 30 days, and ensure the work site is stabilized the day leading up to and the day forecast to be high risk.

6.3.3.3 Exemptions or Additional Requirements

Exemptions from the rule include permit requirements for facilities operating under an industrial permit, as well as road maintenance activities (these activities are however subject to applicable standards), emergency repair of activities (these do not require an application or permit), pitched rooftop tile operations, vehicle test and development facilities, non-mechanically adjusted initial landscapes, and in case of an emergency, stabilization actions can be taken before submitting a permit. There is also an exemption from the opacity standard in high wind conditions, if the applicable control measures requirements were sufficiently implemented so that disturbed areas are stabilized and one of the following is met: (1) the facility ceases operating until opacity requirements are no longer exceeded or (2) maintain documentation that the continued dust generating operations are not contributing to the opacity violation. Such documentation may include onsite opacity observations by a certified observer.

6.3.3.4 Alternative Practices

A regulated registrant may propose other control measures not specifically listed, as long as the alternative measures are approved by the director of Pinal County Air Quality Control District and the EPA Administrator.

6.3.3.5 Notice

The definitions and rule requirements are sufficiently clear so as to put the regulated public on notice. Pinal County has worked closely with industry representatives to ensure the rule is understandable and clear so that the construction industry can comply with it. Industry representatives, Pinal County, and ADEQ intend to conduct outreach to ensure the regulated

construction entities are informed of the rule and how to sign up for the high risk forecast. Where needed, the rule relies on specified test methods to ensure compliance.

6.3.3.6 Compliance Schedule

Per the language of the rule, the construction rule will become effective January 1, 2016. From that point on, the regulated community must comply with the rule. T

6.3.3.7 Records

An owner/operator of a work site shall maintain a copy of his signed permit and shall keep records of every other week inspections and an owner/operator of a work site 5 acres or larger shall also keep records of his site-wide inspection reports for the day leading up to and of the day forecast to be high risk. Upon notice, an owner/operator shall provide Pinal County with inspection records as soon as practicable, but no later than 72 hours from the verbal or written notice. The owner/operator shall notify Pinal County of project completion no later than 30 days after completion date. Owners/operators of work sites five acres or larger shall post a project information sign at the work site main entrance, visible to the public.

6.3.3.8 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 Pinal County's authority to enforce, as listed above. Applicable methods are listed in Table 6-7 below.

Table 6-7 Construction Rule Test Methods

Test Method	Location in the rule and purpose
Visible Crust Determination [The Drop Ball Test] as defined in PCAQCD Code § 4-9-329.B.1	§ 4-3-170(21), in the definition for "stabilize," to ensure surface crusting is resistant to wind-driven fugitive dust
Applicable Opacity Test Method as defined in PCAQCD Code § 4-9-340	§ 4-3-180(A), in the recordkeeping requirements to ensure that work sites do not conduct or allow dust generating operations to result in opacity exceeding 20%

6.3.4 Credited Annual Emissions Reductions

Those emissions reductions attributable to emissions reductions credited from the Construction Rule are listed in Table 6-8 below.

Table 6-8 Annual Inventory Reductions Attributable to Construction Rule (TPY)

ADEQ estimated the following emissions reductions based on 2018 assumptions (e.g., that 30 miles of unpaved road controls are in place, implemented in 2016 and 2017).	Trackout	All other provisions	*Construction Rule Subtotal*

Windblown dust	Residential Construction		407.0	*407.0*
	Commercial Construction		225.1	*225.1*
	Site Development		273.3	*273.3*
	Subtotal		905.4	*905.4*
Activity-based emissions	Paved Road	5.0[120]		*5.0*
	Construction		3,781.3	*3,781.3*
	Subtotal	5.0	3,781.3	*3,786.2*
	Total	5.0	4,686.64	*4,691.6*

6.4 Statutory Amendments

6.4.1 Agricultural Best Management Practices - Arizona Revised Statutes (A.R.S.) § 49-457

The statute establishing agricultural best management practices committee was revised in April 2015. The statute has previously been submitted and approved as a part of the SIP, and the most recent revisions provide key assurances that facilities will immediately implement the BMPs as mandated under the applicable rules.

The unrevised version of the statute was first submitted on September 4, 1998 and approved on June 17, 1999.[121] The statute as revised is effective from and after January 1, 2016, which is the applicable implementation date of the rules.[122] The revisions since original approval are various and some important revisions include:

1. The Agricultural BMP Committee expanded its size by increasing number of industry representatives,

[120] This actually reflects reductions in trackout emissions from a combination of both the construction and fugitive rules, but this number was never numerically separated to attribute the respective reductions to each rule.
[121] *See generally*, Approval and Promulgation of Arizona-Maricopa PM-10 Nonattainment Area Implementation Plan, 64 FR 34726, 34732 (Jun. 29, 1999)
[122] *See,* Exhibit G-IV: A.R.S. §49-457 (2015) (effective Jan. 1, 2016); *see also* Exhibit GIII-1 for House Bill 2394, Amending A.R.S. § 49-457 (Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1).

2. A person engaged in agricultural activity (in a regulated area) shall immediately comply with the agricultural general permit, immediate compliance being effective January 1, 2016,
3. The best management practices general permit must include recordkeeping and reporting requirements,
4. Best management practices and the ensuing program is effective in any nonattainment area for PM10 established after June 1, 2009,
5. Identification of specifically regulated areas within commercial farms and animal operations, as well as earthmoving activities on commercial farms,
6. A provision to regulate irrigation districts (irrigation and water conservation districts) and their respective sources of PM, and
7. A more specific definition of regulated agricultural activities and regulated area.

6.4.2 High Risk Forecast - Arizona Revised Statutes (A.R.S.) § 49-424(11)

ADEQ has the primary duty to flag high risk forecasts for the West Pinal nonattainment area. The ADEQ, Air Quality, Assessment Section then sends out a mass mailing each day informing the public, through Govdelivery.com, as to whether the day is high risk for PM_{10} or not. When developing forecasts, ADEQ evaluates several factors including projected meteorological conditions, existing concentrations of air pollution at the time of the forecast, and historic air pollution concentrations that have been observed during meteorological conditions similar to those predicted in the forecast. Meteorological conditions considered include wind speed and direction, stagnation, recent and potential for precipitation.

Since A.R.S. § 49-424 was last submitted and approved into the SIP,[123] the high risk forecast section (Section 11) was revised in 2014 to mandate air quality dust forecasts for any other PM_{10} nonattainment or maintenance area designated in Arizona after December 31, 2011, in addition to forecasts for the Maricopa County PM_{10} nonattainment area.

The statute is referred to in all three of the rule schemas submitted for EPA's review.

6.5 Adequate Resources[124]

6.5.1 Adequate Resources – Agricultural Rules

The costs of the rulemaking to ADEQ and Arizona Department of Agriculture (ADA) will be minimal. ADA is included in this adequate resources discussion because ADA is prescribed duties in the rule.

[123] Partial Approval and Disapproval of Arizona PM Implementation Plan, 77 FR 66398 (November 5, 2012).
[124] *See*, C.A.A. § 110(a)(2)(E)(i); 40 C.F.R. § 51.280.

ADA and ADEQ will have to expend time and monetary resources for revising and printing new guidebooks and for education. ADEQ and ADA staff will have to expend time learning the new rules and ADEQ will have to revise its compliance strategies to implement the rules. ADEQ estimates that the current number of full time employees assigned in Compliance Section of the Air Quality Division is adequate to implement and enforce the new rules. ADEQ does enforce agricultural rules throughout the state. However, ADEQ intends to prioritize and focus, at least preliminarily and as needed, on agricultural enforcement in West Pinal County to ensure that ADEQ provides the assistance, education, and enforcement necessary to carry out the rules to reach attainment in the nonattainment area.

ADEQ expects the new recordkeeping costs associated with this rulemaking to be minimal, as the forms have changed minimally, and although they must be turned in to the ADA, it is still undecided if postage can be covered by ADEQ, ADA, or an electronic delivery system could be put into place. ADEQ is still developing the survey forms that will be due in 2018 to report on the 2017 year. Additionally, ADEQ and ADA will have to spend time and resources to compile data from the submitted three year surveys. Of the recordkeeping costs, this would require the most time and expense.

Overall, ADEQ expects the financial impact of the additional rules to be minimal, even though the rule imposes an administrative burden on the enforcement agency and on the ADA for collection of forms. The general permit that is credited as part of these rules is not fee based, and therefore, the cost of resources will be covered through the use of other budgetary resources at both agencies. ADEQ's program should be effectively handled by its current personnel without any additional staffing or resources requirements. ADEQ has a sufficient budget to support the program and commits to support the program at least through the next 5 years.

6.5.2 Adequate Resources - Fugitive Dust and Construction Rules

Fugitive dust inspections, response to citizen complaints, primary oversight of dust permit issuance, and enforcement are managed by staff within Pinal County Air Quality Control District Field Services. Field Services consist of a manager (half time - split between monitoring and compliance), and two field inspectors. Field Services inspectors conduct scheduled inspections of permitting activities, complaint-based inspections, and random inspections of observed activities. Inspectors average in excess of 40 inspections per month depending on variables such as travel time and source complexity. Additionally, a Lead Compliance Engineer placed within Pinal County Air Quality Control District Permitting oversees fugitive dust compliance at permitted sources through scheduled and unannounced inspections. Over-the-counter construction dust permits are issued each day during normal business hours at the main office and one day per week at two satellite offices by a rotating assignment of department wide staff. During the in-person permit application and issuance process applicants are provided guidance for compliance.

The current staffing level has been in place since 2010 coinciding with the slowdown in construction activity in Pinal County. Construction projections in the county show a slow to

moderate increase over the next 5 years. Projecting 1, 3, and 5 years into the future, Pinal County anticipates sustaining the current effort to conduct scheduled inspections of permitted dust sources as well as proactive inspections of area dust emissions. With the current level of dust permits issued annually, the staffing level will be sufficient in future years.

7 ATTAINMENT DEMONSTRATION AND REASONABLE FURTHER PROGRESS

Effective July 2, 2012, the EPA redesignated the West Pinal area from an unclassifiable area to a moderate nonattainment area. This action required Arizona to demonstrate (1) that the plan will provide for attainment as expeditiously as practicable but no later than the attainment date,[125] or a demonstration that attainment by such date is impracticable,[126] and (2) quantitative milestones, which demonstrate reasonable further progress (RFP) toward timely attainment,[127] that are to be achieved every 3 years until the area is redesignated attainment.[128]

ADEQ has demonstrated attainment no later than December 2018 and has verified sufficient annual incremental emission reductions to satisfy reasonable further progress requirements.

7.1 Attainment Demonstration

This section briefly describes the methods for demonstrating and modeling attainment in the West Pinal Nonattainment Area, with attainment expected no later than December 2018. More specifically, this chapter explains ADEQ's steps in determining modeling domains and methodologies, including how modeling design days were chosen, as well as how the controls from the recently revised Agricultural Best Management Practices Committee rules (collectively referred to hereinafter as the "AgBMP rules") were accounted for in the attainment demonstration. The West Pinal AgBMP rules, except for the dairy applicable section, are the only rules used to demonstrate attainment in this SIP.[129] More discussion regarding the AgBMP rules themselves can be found in Chapter 6 of this document and also the RACM Document, Appendix F.

Inventory analysis showed that two distinct meteorological scenarios produced concentrations in excess of the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) of 150µg/m^3: high wind and stagnation conditions. The emission sources responsible for the elevated concentrations are fundamentally different under these two scenarios.[130] Therefore, the two meteorological scenarios required the use of different design days, for which monitor-specific

[125] i.e. end of December 2018. *See*, C.A.A. § 188(c)(1) (2012) ("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…").
[126] *See* C.A.A. § 189(a)(1)(B) (2012).
[127] As defined in C.A.A. § 171(1) (2012).
[128] *See* C.A.A. § 189(c)(1) (2012).
[129] Emissions reductions resulting from the dairy operations section, A.A.C. R18-2-611.03(D), have been applied toward contingency measures instead of attainment. More information on contingency measures is contained in Chapter 6 of the SIP main body and Appendix D.
[130] See Appendix A (IPP), Section 3.2, p. 50, for more information.

inventories were developed, with separate concentration calculation methodologies utilized for high wind and stagnation design days. Differences in source mix and the range of meteorological conditions affecting emissions in the area guided the decision to select at least one stagnation and one high wind design day for each nonattaining monitor, as applicable per exceedance data.[131]

7.1.1 Stagnation Attainment Modeling Background

7.1.1.1 Stagnation Condition Description

During stagnation periods, when wind speeds are typically below 3 mph, wind entrainment of loose soil particles is virtually nonexistent and mechanical sources that lift particles into the air through combustion, vehicle movement, and other anthropogenic activities are primarily responsible for recorded concentrations. Particles accumulate in the air without any meteorological reprieve during stagnation periods.

7.1.1.2 Stagnation Design Day Selection

After analysis of all stagnation day exceedances in 2008, three monitors exceeded the 24-hour PM_{10} NAAQS. Two days were found to be the most representative after isolating quality assured data and noting that there were no high wind speed hours recorded on the selected days.[132] The meteorological conditions were most representative for the Pinal County Housing and Stanfield monitors on October 29, 2008. Cowtown also exceeded on October 30, 2008. However, the closure of several significant emission sources near the Cowtown monitor between 2008 and 2011 and the continued recording of 24-hour PM_{10} exceedances at the monitor caused a reassessment of the October 29, 2008 design day for that monitor. October 30, 2008 exhibited similar meteorological conditions and was found to be most representative for the Cowtown monitor.[133]

The sites and dates for the selected stagnation design days are listed below:

- Pinal County Housing - October 29, 2008
- Stanfield - October 29, 2008
- Cowtown - October 30, 2008

No PM_{10} exceedances occurred on stagnation days at the Maricopa, Casa Grande, or Combs School monitoring sites, and therefore these monitors were not included in the list of low wind speed attainment demonstrations.[134]

[131] See Appendix A (IPP), Section 3.2, p. 50-51, for more information.
[132] See Appendix A (IPP), Section 3.2, p. 52, for more information.
[133] *See generally* Appendix B (EI TSD) Section 2.2; *see also* Exhibit B-XIII.
[134] *See* Appendix A (IPP), Section 3.3, p. 51, Table 3-2.

The closure of several significant emission sources near the Cowtown monitor between 2008 and 2011 and the continued recording of 24-hour PM_{10} exceedances at the monitor caused a reassessment of the October 29, 2008 design day for that monitor. The resulting analysis, presented in Exhibit 12, led to the selection of October 30, 2008 to represent low wind conditions at the Cowtown monitor.[135]

7.1.1.3 Stagnation Domain Boundary Selection

Separate domains were defined for each of the three selected monitors. To define low wind domains for the modeling inventories, rectangular boundaries were demarcated based on the maximum hourly distance traversed by wind parcels from the monitor to the source.[136] Transport distances are relatively short under low wind conditions, therefore only those sources within close proximity (varying by monitor's modeling domain) of a monitor contribute to high hourly PM_{10} concentrations during stagnation conditions.[137]

The Cotton Research and Protection Council (CRPC) characterized crops under cultivation in 2008 for a 6 km radius (3.7 mi) surrounding the nonattaining monitors of Cowtown, Maricopa, Pinal County Housing, and Stanfield. CRPC data did not include characterization of crop lands outside of this 6 km boundary or Indian Reservation crop lands. Assumptions for nonidentified agricultural lands and additional sources on Gila River Indian Community and AK-Chin land, such as unpaved roads and point sources are described in Section 3.1.1.13 of Appendix B (EI TSD).

7.1.1.4 Stagnation Model Method Selection - AERMOD

After review of EPA guidelines and fugitive dust modeling demonstration in MAG plans, ADEQ decided that AERMOD is the most suitable model for evaluating hourly source contributions to PM_{10} exceedances recorded at Pinal County monitors on stagnation design days. AERMOD, a steady-state Gaussian plume dispersion model that assesses pollutant concentrations from a variety of source types, is very effective for predicting emissions during near calm conditions.[138]

On stagnation days, AERMOD was run with meteorological data recorded at the subject monitor and emissions rates for each source within the modeling domain, as calculated from reported activity data and best-representative emissions factors.[139] A domain specific average emissions rate was computed for the crops included within the CRPC domains and was applied to each agricultural crop parcel in the tribal domain. Small portions of the modeling domains fall outside of the CRPC boundary so assumptions about crop activity on agricultural lands outside the boundary were needed.[140]

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[135] *See generally* Appendix B (EI TSD), Section 2.2.
[136] *See generally* Appendix B (EI TSD), Section 1.1.
[137] *See generally* Appendix A (IPP), Section 3.2.
[138] *See generally* Appendix C (Modeling TSD), Section 2.
[139] Appendix C (Modeling TSD), p. 2.
[140] *See generally* Appendix B (EI TSD), Sections 3.1.1.1 and 3.1.1.13.

7.1.1.5 Stagnation Modeling Inventory

The stagnation inventory methodology follows closely to that described in the activity based emissions annual inventory described in Chapter 5, except that the inventories for modeling purposes were developed specifically for the individual monitor modeling domains and emission rates were developed at an hourly scale. [141]

7.1.1.6 Other Stagnation Modeling Factors

Emission methodologies for calculating activity based fugitive dust for all land use categories are described in section 3.1.1 of Appendix B (EI TSD). Any changes in dust generating activities between 2008 and 2018, other than additional controls resulting from this plan, are described in Section 3.2.1 of Appendix B (EI TSD).

7.1.2 High Wind Attainment Modeling Background

7.1.2.1 High Wind Day Condition Description

During high wind conditions, windblown dust emissions from disturbed soil surfaces typically dominate PM_{10} emissions. Windblown dust emission magnitude is directly proportional to wind velocity, disturbed surface area, and the soil texture.[142] Sources within a narrow band along the upwind trajectory tend to contribute significantly to recorded PM_{10} concentrations, because of the tendency of wind trajectories to remain somewhat constant during these periods.[143] High wind days are comprised of both high wind hours (including windblown and activity emissions) and low wind hours (containing only activity emissions).[144]

7.1.2.2 High Wind Design Day Selection

To identify high wind days, the PM_{10} exceedance days recorded at each of the six nonattainment monitoring sites were screened for high hourly average wind speeds (over 12 mph) during hours of high PM10 concentrations.[145] The analysis of PM_{10} exceedances on high wind days selected four monitors determined to be representative of conditions throughout the year, at the sites and dates listed below.[146]

- Cowtown – April 27, 2008
- Pinal County Housing – January 1, 2008
- Stanfield – November 21, 2008
- Maricopa – October 27, 2008

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[141] *See generally* Appendix B (EI TSD), Sections 3.1.1 and 3.2.1.
[142] Appendix A (IPP), Section 3.4, p. 52.
[143] Appendix A (IPP), Section 3.2, p. 50.
[144] See generally Appendix B (EI TSD), Section 2.1.
[145] Appendix A (IPP), Section 3.4, p. 52.
[146] See Appendix A (IPP), Sections 3.5 through 3.9 for information on the methodology of choosing representative dates.

7.1.2.3 High Wind Domain Boundary Selection

7.1.2.3.1 High Wind Hour Domains

A relatively complex approach was used to define domains for high wind days. The domain for the high wind hours in the West Pinal nonattainment area followed the methodology that Maricopa Association of Governments (MAG) used in the 2012 Five Percent Plan,[147] which plotted a back trajectory based on the average wind speed and direction recorded for each high wind hour.[148]

GIS shapefiles developed by PCAQCD and ADEQ provided land use information for the entire nonattainment area. However, outside of the 6 km radius supplied by CRPC, no information was available for specific crops under cultivation on agricultural lands. This is problematic as particulates transport further under high wind conditions, and agriculture is the dominant land use within the nonattainment area. Agricultural windblown emissions are strongly affected by specific crops under cultivation.[149]

Transport analysis determined that 80% of the impacts, assuming equivalent source strength, would come from sources located within 4 miles of a 12 mile upwind trajectory[150]. Little insight would be gained from characterizing sources beyond the 6 km (3.7 miles). Therefore, ADEQ decided to restrict the size of the domain to relevant boundaries within the 6 km CRPC area, allowing for the specific domain shape and size definition.[151] Using the approach, a triangular domain extends from each monitor along the high wind trajectory hours reflecting the monitor specific design day data. The domain is bounded by a 6 km arc.[152] Some of the area within the domains was actually Gila River Indian Community (GRIC) land.[153] ADEQ could only collect limited information from the GRIC, therefore, assumptions were applied for land uses within GRIC land.[154]

7.1.2.3.2 Low Wind Hour Domains[155]

Unlike the high wind domains where wind direction and emissions are consistently from a single quadrant, wind and emissions impacting the monitor during low wind hours come from all directions, similar to stagnation emission impacts. A rectangular domain is defined by the maximum hourly wind directions and speeds. The domain is considerably larger than the 6 km

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[147] MAG 2012 Five Percent Plan for PM_{10} for Maricopa County Nonattainment Area, Maricopa Association of Governments, May 2012.
[148] See Appendix B (EI TSD) for more information on domain methodology development.
[149] *See generally* Appendix B (EI TSD), Section 2.
[150] *See generally* Appendix B (EI TSD), Section 2.1
[151] *See generally* Appendix B (EI TSD), Section 2.1
[152] *See generally* Appendix B (EI TSD), Section 2.1
[153] *See generally* Appendix B (EI TSD), Section 2.1
[154] *See generally* Appendix B (EI TSD), Section 3.1.1.13.
[155] Low wind hours are assigned a high wind day domain because high wind days are comprised of both high and low wind hours.

radius of crop data provided by CRPC.[156] Assumptions were required for land outside of the information from CRPC.[157]

Low wind hour activity emissions are estimated using the same methods as activity emissions on stagnation days. However, low wind hours take place on high wind days (or non-stagnation days). Because not every hour of a high wind day will have wind speeds of 12 mph or more, calculated activity emissions from low wind hours and high wind hours are added to high wind hour windblown dust emission totals.

7.1.2.4 Model Method Selection - Rollback

The method used to assess high wind hour source apportionment and to provide a basis for demonstrating attainment is the weighted rollback method, an approach that was employed in MAG's Five Percent Plan[158] and approved by EPA.[159] In MAG's experience, neither AERMOD nor photochemical grid models performed well to quantify specific area source contributions to monitors during high winds, and in fact were unreliable. MAG developed a more reliable rollback approach.[160]

The weighted rollback approach applies a distance reduction factor to the emissions of each source in the modeling domain to help assess the impact of emissions as distance from the monitor increases.[161] The approach weights the contribution of each upwind source's emissions by the reciprocal of its distance to the monitor and assumes that each source's fractional contribution to the sum of weighted emissions is equal to that source's fractional contribution to the hourly PM_{10} concentration measured at the downwind monitor (i.e., that the impacts of emissions from nearby sources are proportionally greater than the impacts from remote sources, assuming equivalent emissions rates among sources).[162]

In contrast to Maricopa County, which had not experienced a low wind violation of the PM10 standard since 2007, Pinal County experienced violations on both stagnation and high wind days. A review of high wind day hours revealed that low wind hour concentrations on high wind days sometimes exceeded high wind hour concentrations at each of the monitors. Based on this finding, decisions were made (1) to model the effect of low wind hour mechanically generated emissions and (2) to model both mechanically generated emissions and windblown dust emissions during high wind hours.[163]

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[156] *See generally* Appendix B (EI TSD), Section 3.1.2.
[157] *See generally* Appendix B (EI TSD), Sections 3.1.1.1 and 3.1.1.13.
[158] Maricopa Association of Governments, MAG 2012 Five Percent Plan for PM-10 for Maricopa County Nonattainment Area, Section 6, Attainment Demonstration (May 2012).
[159] *See* Appendix C (Modeling TSD), Section 3.1.
[160] *Id*.
[161] *See generally* Appendix C (Modeling TSD), Section 3.1, p. 27.
[162] *See* Appendix C (Modeling TSD), Section 1, p. 2.
[163] *See* Appendix C (Modeling TSD), Section 3.1, p. 28.

Therefore, for both high wind hours (>12 mph) and low wind hours (≤12 mph) on high wind days, the weighted rollback method was used to assess the relative contribution of each upwind source to the hourly monitored PM_{10} nonattainment area.[164]

The rollback method as applied assumes (1) emission factor uniformity within "disturbed" and "undisturbed" states of surface soil conditions and (2) an inverse relationship between the source's distance from the monitor and the emission impact at that monitor.[165]

Because the calculation of windblown emissions can be tricky to follow, below is an example high wind calculation for disturbed agricultural land.

Example Windblown Calculation for Disturbed Agricultural Land:

Assume calculation of the hourly windblown emissions from a 50 acre (202,343 m^2) cotton field located 1.3 miles directly upwind of the Pinal County Housing (PCH) monitor during harvesting season for a single hour averaging 22 mph wind speed. This is the fourth consecutive hour of high winds (i.e. >12mph) for this wind event and one hour following the maximum measured concentration for this wind event at the PCH monitor. The harvesting season is assumed to have fully disturbed soil, so use of Equation 1 on page 3-90 of Appendix B is appropriate (Note: For those lands determined to be partially disturbed, Equations 1 and 2 on page 3-90 and 3-91 of Appendix B would be employed and the area utilized in each equation would be the product of the area of the parcel and the disturbed fraction and stable fraction of the land of interest, respectively.)

$$E_{sj} = F_{EFAdjustment} \times A \times EF_{Disturbed\ bin} \times V'$$

where:

Esj = suspended PM_{10} in gram/sec for hour j

$F_{EFAdjustment}$ = the emission adjustment factor for diminished particle supply (detailed in Appendix B, Exhibit B-VII)

A = the area of each crop's land parcel, in m^2

$EF_{Disturbed,bin}$ = the windblown dust emission factor developed for disturbed soil for a given wind speed bin, gram/m^2-sec for hour j (detailed in Appendix B, Exhibit B-V)

V' = crop specific vegetative cover, presented in Appendix B, Table 3-48

Table 7-1 Values used for Example Windblown Dust Calculation

Variable	Value	Units	Source

[164] *See* Appendix C (Modeling TSD), Section 1, p. 2.
[165] *See* Appendix C (Modeling TSD), Section 1, p. 2.

$F_{EFAdjustment}$	51	%	Appendix BVII, Table BVII-4
A	202,343	m^2	Given in assumptions (area of the field)
$EF_{Disturbed,bin}$	4.27E-04	g/m^2-s	Appendix BV, Table BV-4
V'	0.7	Unit-less	Table 3-48

Using the values presented in Table 7-1 and the equation above, we can calculate windblown emissions from the cotton field during this single hour of high wind as:

$$E_{sj} = 0.51 \times 202{,}343\, m^2 \times 0.000427 \frac{g}{m^2 - s} \times 0.7 = 30.8 \frac{g}{s} \times 3600 \frac{s}{hr} \div 453.6 \frac{g}{lb} = 244 \frac{lb}{hr}$$

The emissions produced within that hour are 245 lbs. This can then be modeled as monitor impacts by dividing by the straight-line distance to the monitor (1.3 miles). This results in a monitor impact of 188 lb/mile.

If this impact was assumed to occur on the 2008 Pinal County Housing (PCH) high wind design day and only assumed to occur for this one hour, we can normalize this impact to the monitor by dividing the individual cotton field's impact calculated above by the total emission impacts on the monitor for that day (25,258 lb/mile; calculated as the sum of the hourly total impacts presented in Appendix C (Modeling TSD), Section 3.3, Table 3-1) multiplied by the non-background monitor 24-hour average (247.4 µg/m^3)[166]. This results in a 24-hr average impact of this single cotton field on the monitor of 1.8 µg/m^3 for the PCH design day.

7.1.2.5 High Wind Modeling Inventory

With some Pinal specific revisions detailed in the technical supporting documents,[167] ADEQ closely followed MAG's 2012 5% PM10 Plan high wind methodology to model for an inventory and to identify significant sources within the nonattainment area. ADEQ calculated and adjusted high wind emissions factors utilizing the methodology described in Chapter 5. To model source impacts on the monitor, design-day specific meteorological information from a respective monitor was used in conjunction with design-day calculated emission rates for each parcel within the monitor's modeling domain.[168] Land use categorization determines the disturbed versus stable land, in turn defining hourly emission rates. Emission methodologies for calculating high wind fugitive dust for all land use categories are described in Section 3.1.2 of Appendix B (EI TSD).

[166] 247.4 µg/m^3 is calculated as the design day concentration (264.9 µg/m^3) minus the calculated non-anthropogenic background on high risk days (17.5 µg/m^3), See Appendix C (Modeling TSD) Section 3.2 for more information.
[167] *See* Appendix B (EI TSD), Section 3.1.2, p.109-110.
[168] *See* Appendix A (IPP), p. 3.

7.1.2.6 Other Factors

Emission methodologies for calculating high wind fugitive dust for all land use categories are described in section 3.1.2 of Appendix B (EI TSD). Any changes in high wind emissions between 2008 and 2018, other than additional controls resulting from this plan, are described in Section 3.2.2 of Appendix B (EI TSD).

7.1.3 How ADEQ Accounted for Attainment Controls

Generally, attainment was modeled using the rules applicable to crop and animal operations, except for dairy operations (these were used for contingency measures). Please find a more detailed discussion regarding the Agricultural Rules themselves in Chapter 6 of this document, the RACM Document, Appendix F, and the Notice of Exempt Rulemaking, Exhibit G-VI.

7.1.3.1 Crop Operations

In order to estimate commercial crop farm emission reductions associated with the implementation of this rule, ADEQ required an understanding of which BMPs a commercial crop farmer would be most likely to implement for each operation. With the help of the Agricultural Best Management Practices Committee (Ag BMP Committee), ADEQ surveyed Pinal County crop farmers to determine the likelihood of individual BMP implementation. Farmers were surveyed to determine the likely BMP strategies they would implement on individual crops on non-high wind and high wind forecasted days. Survey responses were separated by crop type. Weighted average control efficiencies for each crop type were calculated and applied to the emission rates for those individual crops and activities. The control efficiencies were weighted based on survey responses regarding crop acreage and the number of responses given for each crop type and associated regulated activity. For more information regarding the crop operations survey methodology, please see Section 3.1.1.1 of Appendix D (Attainment Demonstration TSD).

In additions, crop operation activity, distribution, and acreage were assumed constant between 2008 and 2018. For 2018 controlled calculations, however, high risk control efficiencies were applied to design day activity and windblown emissions under the assumption that all design days would be forecast as high risk. For windblown emissions, the implementation of the AgBMP rule resulted in reduced windblown dust emissions from croplands due to the implementation of BMPs that either reduced emissions through ground stabilization or increased ground cover.

7.1.3.2 Confined Animal Feeding Operations (CAFOs)

Cattle populations on CAFOs in the nonattainment area in 2018 are expected to be 38% lower than in 2008, due mainly to the closing, consolidating, or repurposing of half of the feedlots. These closures also reduced windblown dust emissions from the former feedlot sites. For windblown modeling purposes, these locations were assumed to transition from the CAFO land use to the Cleared Areas land use category.

Based on a poll of the CAFO operators who still have active operations in the NA (there are only 3), ADEQ developed a most likely profile of operational changes that would be in place by 2018 to facilitate compliance with the new state AgBMP rule. These include a combination of watering practices and cleaning schedule changes, as well as traffic controls. For 2018 controlled calculations, however, high risk control efficiencies were applied to design day activity and windblown emissions under the assumption that all design days would be forecast as high risk. Based on the estimated number of high risk days, ADEQ estimated that in annual terms (not design days), 2018 controls would be 15.5% more effective than 2008 controls in reducing activity-driven dust, and 10.1% more effective for windblown dust.

7.1.4 Comparative Concentration Table

Below is a table comparing the past and projected design value concentrations between the 2008 base year, the projected 2018 base year, and the projected-controlled year 2018. The projected-controlled 2018 year only accounts for attainment controls, and no contingency controls.

Table 7-2 Comparative Design Day Concentration between Base 2008, Projected 2018, and Projected Controlled 2018

Year	Design day		Background concentration (µg/m³)	Design value (µg/m³)	
2008	Stagnation	Cowtown	11.5	**244.5**	Monitor observations
		Pinal County Housing		**178.0**	
		Stanfield		**162.0**	
	High-Wind	Cowtown	17.5	**168.3**	
		Maricopa		**159.4**	
		Pinal County Housing		**264.9**	
		Stanfield		**178.6**	
2018	Stagnation	Cowtown	11.5	**188.4**	Modeled projections
		Pinal County Housing		**179.6**	
		Stanfield		**197.7**	
	High-Wind	Cowtown	17.5	**163.7**	
		Maricopa		**140.0**	
		Pinal County Housing		**262.7**	
		Stanfield		**186.0**	
Att	gn ati	Cowtown	11.5	**152.5**	pro

		Pinal County Housing		**154.9**	
		Stanfield		**154.7**	
	High-Wind	Cowtown	17.5	**120.8**	
		Maricopa		**124.3**	
		Pinal County Housing		**135.3**	
		Stanfield		**112.2**	

7.1.5 Annual Inventory Attainment Reductions

Below is a table reiterating the amount of reductions achieved by the agricultural rule alone (not including provisions applicable to dairy operations or canal access roads).

Table 7-3 Annual Inventory Reductions from the Attainment Targeting Sections of the Ag BMP Rules (TPY)

Land Use/Source Category		Unpaved apron roads	Unpaved canal O&M roads	Harvesting and Tilling	CAFOs
Windblown Dust	Unpaved Roads	705.2	144.7		
	CAFOs				29.9
	Agriculture			12388.1	
	Subtotal	705.2	144.7	12388.1	29.9
Activity-based emissions	Ag Fields - Harvesting			105.8	
	Ag Fields - Tilling			882.3	
	CAFOs				251.4
	Unpaved Roads	7341.3	577.6		
	Subtotal	7341.3	577.6	988.1	251.4
Total		8045.5	722.3	13376.2	281.3
Grand Total					**22426.3**

7.2 Reasonable Further Progress

Under section 189(c)(1), this nonattainment plan must demonstrate Reasonable Further Progress (RFP), which "means such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for

the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date."[169]

EPA has stated in guidance, "where the nonattainment problem is attributed to area type sources (e.g., fugitive dust, residential wood combustion, etc.), RFP should be met by showing annual incremental emission reductions generally sufficient to maintain linear progress towards attainment. Total PM-10 emissions should not remain constant or increase from 1 year to the next in such an area."[170] The annual incremental emission reductions to be achieved should be reasonable in light of the statutory objective to ensure timely attainment of the PM_{10} NAAQS.[171]

The West Pinal nonattainment area is projected to reduce emissions to meet attainment within a three year period, with annual inventory reductions totaling 22,426.3 tons over the three years. With a three-year horizon from the end of 2015 to modeled attainment at the end of 2018, a linear implementation schedule would require a glide path showing annual reductions 7475.4 tons per year.

The actual implementation plan causes an acute reduction in the first year, from the end of 2015 to the end of 2016, followed by slow and steady reductions until the end of 2018. The actual implementation and emissions reductions path is projected to be quite steep in the first year because the measures credited toward attainment, the agricultural rules, are more fitted for upfront reduction credit. In the relatively short amount of time within which the West Pinal nonattainment area must reduce PM_{10} emissions to meet the attainment date, the chosen glide path in Figure 7-1 below is the most reasonable solution and representation of reasonable further progress to meet attainment.

[169] C.A.A. § 171(1) (2012).
[170] Proposed Approval of Maricopa County PM10 Nonattainment Area Five Percent Plan, 79 FR 7118 at 7123 (Feb. 6, 2014).
[171] Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 59 FR 41998, 42015 (Aug. 16, 1994).

Figure 7-1 Reasonable Further Progress from Dec. '15 through Dec. '18

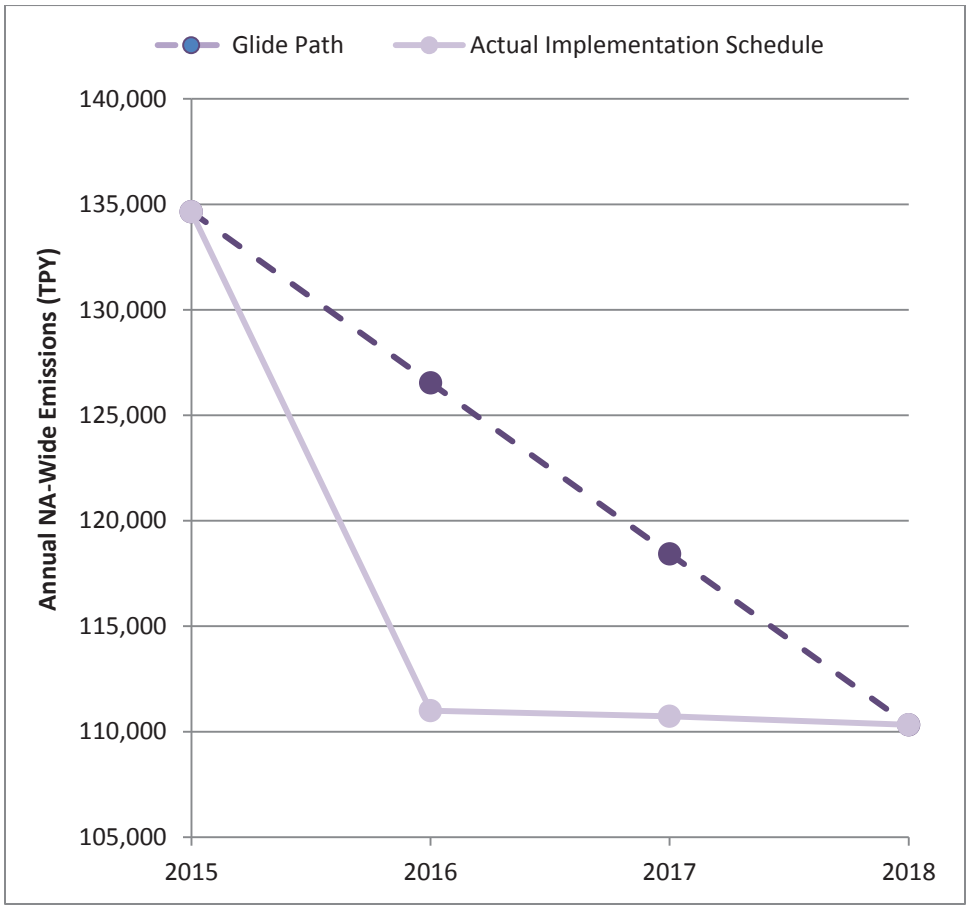

Figure 7-2: Reasonable Further Progress from Dec. '15 through Dec. '18

Reasonable Further Progress qualitative milestones must be achieved every three years. In the case that the agricultural rules developed for attainment under this plan do not alone allow for the achievement of qualitative milestones every three years, contingency measures will already be in place to assure attainment.

If an area fails to make reasonable further progress, CAA Section 172(c)(9) requires the implementation of contingency measures. EPA recommends that contingency measures for PM_{10} nonattainment areas provide emission reductions equivalent to one year's average increment of RFP.[172] EPA has further interpreted section 172(c)(9) to allow states to implement contingency measures before they are triggered by a failure of RFP or attainment as long as

[172] Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 59 FR 41998, 42014 (Aug. 16, 1994).

those measures are intended to achieve reductions over and beyond those relied on in the attainment and RFP demonstrations.[173]

ADEQ has provided for additional emissions controls and consequent reductions that will ensure continued progress toward attainment and RFP past the attainment date until the West Pinal Area is redesignated. These measures include the agricultural dairy controls, the Pinal County construction controls, trackout controls, and most of all, the Pinal County General Fugitive Dust Rule. The reductions from all of these rules and provisions is projected to total 7,474.8 by 2018, as shown in Table 7-4 below.[174]

Table 7-4 Summary of Contingency Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-611.03	Commercial dairy operations	January 1, 2016	101.2
PCAQCD Code of Regulations, §4-3-160, -170, -180, and -190	Permitted construction projects	January 1, 2016	4,679.4[175]
PCAQCD Code of Regulations, §4-1-010, -015, -020, -030, -040, -045, -050, and -060	Several prescribed area sources of fugitive dust, including vacant lots and other open areas, roads, and other traffic areas.	Effective January 1, 2016, with some controls being implemented progressively	2,962.3
Total			7,742.9

In addition, PM_{10} nonattainment SIPs are required by section 189(c) to contain quantitative milestones to be achieved every three years and which are consistent with RFP for the area. These quantitative milestones should consist of elements which allow progress to be quantified or measured.[176] The quantitative milestones are "to be achieved until the area is redesignated attainment."[177]

According to current EPA policy, the three year quantitative milestone report requirement runs from the nonattainment SIP submittal due date,[178] which, in this case, was 18 months from the

[173] *See* Proposed Approval of Maricopa County Serious Nonattainment Area Plan, 75 FR 54806, at 54815 (Sept. 9, 2010). *See generally*, LEAN v. EPA, 382 F.3d 575 (5th Cir. 2004). *See also* General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 57 Fed. Reg. 13,498, at 13512.
[174] For more information regarding the details of contingency measure calculations to meet one year's worth of RFP, please see Appendix D, Section D5.2.
[175] Up to 5 TPY of reductions attributed to the construction rule may actually be attributable to the general fugitive dust rule instead, but were consolidated in the construction rule subtotal as an expediency. See Appendix D Sections D5.2.2.1 and D5.2.3.4 for details.
[176] Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990, 59 FR 41998, 42016 (Aug. 16, 1994).
[177] C.A.A. § 189(c) (2012).
[178] Fine Particulate Matter NAAQS SIP Requirements, 80 FR 15340, 15390 (proposed Mar. 23, 2015).

effective redesignation date, July 12, 2012. To align with the policy, the ADEQ intends to submit West Pinal PM10 milestone report in the beginning of 2017. ADEQ's report will adequately quantify and track progress with its RFP goals. ADEQ anticipates submitting a report that first, demonstrates how emissions reductions achieved by the beginning of 2017 compare to those scheduled, second, analyzes the correlation between the plan and monitoring data, and third, projects whether the area will still meet its scheduled attainment date, also taking into account the already implemented contingency measures.

Generally, ADEQ intends to analyze chosen agricultural BMPs and reduction progress using the agricultural rule's surveys. In the absence of adequate or representative data, ADEQ expects to use apropos compliance data. For example, ADEQ anticipates reporting on the number of producers in compliance at the time of inspection, according to the chosen attainment measures, A.A.C. R18-2-610, -610.03, -611, -611.03(A), (C), & (E)-(O), -612, and -612.01(A)(1) & (B)-(J). In the event it is more accurate than survey data, ADEQ also anticipates using inspection data and/or data from the General Permit Record Forms as reviewed during inspections in order to determine which PM10 reducing BMPs inspected agricultural operations use. From this data, ADEQ may estimate reductions and compare these figures to the projected reductions in this plan.

Appendix A:

Pinal County
PM Inventory Preparation Plan

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Sacramento, California 95811

February 11, 2013

Report No. SR2013-01-01

Pinal County
PM Inventory Preparation Plan

Prepared for

Arizona Department of Environmental Quality

February 11, 2013

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Pinal County PM Inventory Preparation Plan

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February 11, 2013

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Pinal County PM Inventory Preparation Plan

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1. INTRODUCTION

On February 3, 2011, the U.S. Environmental Protection Agency (U.S. EPA) designated the central portion of Pinal County as nonattainment for the 24-hour PM2.5 National Ambient Air Quality Standard (NAAQS), and designated the same area as attainment or unclassified for the annual PM2.5 NAAQS.[1] The rationale for the latter designation was based on the finding that the single monitoring site exceeding the annual standard, Cowtown, was a population-oriented microscale (i.e., localized hot spot) monitor that was not eligible for designation as a nonattainment site for the annual standard. On May 31, 2012, U.S. EPA designated a somewhat larger portion of central Pinal County as nonattainment for the 24-hour PM10 NAAQS.[2] The annual PM10 NAAQS was revoked by U.S. EPA on October 17, 2006. As a result of these decisions, the attainment demonstration for both PM2.5 and PM10 in Pinal County must be based on ambient air quality conditions and contributing emissions on specific design days.

A nonattainment designation reflects monitored airborne pollutant concentrations that exceed the prevailing standard. A nonattainment designation requires a curative amendment to the State Implementation Plan, configured to reduce concentrations below the standard. For purposes of developing that plan, emission inventories define the sources of the offending pollutant. Inventories constitute the practical and regulatory foundation for a plan amendment. Long-term and short-term inventories serve different primary functions. First, an annual inventory defines which sources generate long-term emissions of PM10 across the entire nonattainment area. That general understanding provides the factual basis for discussions regarding long-term emission trends based on changes in underlying activity rates and the impacts of control strategy implementation. In addition, an annual on-road emission inventory is required in order to define an annual emissions budget for transportation planning. Second, attainment demonstrations for the 24-hour PM10 NAAQS require modeling inventories defining the local, short-term emissions that caused specific violations of the 24-hour standard. This document defines a plan for developing those inventories.

Through discussions between U.S. EPA, the Arizona Department of Environmental Quality (ADEQ), and the Pinal County Air Quality Control District (PCAQCD), a base year of 2008 was selected for the preparation of an emission inventory and an attainment demonstration. This is the year of the most recent triennial National Emission Inventory prepared by ADEQ and PCAQCD and approved by U.S. EPA. The EPA implementation rule for preparation of PM2.5 State Implementation Plans (SIP) requires the use of this

[1] Federal Register, Vol. 76, No. 23, Thursday, February 3, 2011
[2] Federal Register, Vol. 77, No. 105, Thursday, May 31, 2012

most recent year for which a complete inventory was required to be submitted to EPA.[3] During 2008, exceedances of the 24-hour PM2.5 NAAQS were recorded at Cowtown; exceedances of the 24-hour PM10 NAAQS were recorded at Maricopa, Cowtown, Stanfield, Casa Grande, Combs School, and Pinal County Housing. At each of these latter sites, continuously recording TEOMs are used to record hourly averaged PM10 ambient concentrations. At the Cowtown site, a filter-based instrument is used to record 24-hour average PM2.5 concentrations.

To support the preparation of PM2.5 and PM10 State Implementation Plans (SIPs), ADEQ commissioned the preparation of an Inventory Preparation Plan (IPP) and an emission inventory based on the IPP. The Plan identifies key requirements, procedures, and data sources to be used in preparing emission inventories for the nonattainment area and for the modeling domains of monitors selected to represent exceedance conditions within the nonattainment area. Standard elements of an IPP include the presentation of EPA guidance and related requirements, a summary of the sources to be addressed and those not to be included, documentation of the procedures to be followed in computing emissions, data sources available to characterize activity and emission factors, local conditions affecting emissions, and quality control procedures to be followed.

To provide a better understanding of the conditions influencing fugitive dust production in the nonattainment area, additional tasks were undertaken (1) to gauge the influence of local versus regional emission sources impacting nonattainment monitors and (2) to select design days and modeling domains of monitors representative of exceedance conditions. Presented below is a summary of EPA guidance on IPP development.

1.1 Emission Inventory Guidance

EPA emission inventory guidance is summarized at the Clearinghouse for Inventories and Emission Factors (CHIEF) website. Guidance for the development of PM10 and PM2.5 emission inventories is available from the documents listed below.

- *PM-10 Emission Inventory Requirements*[4]
- *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations*[5]
- *1996 Air Quality Criteria for Particulate Matter, Vol. 1*[6]

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[3] Federal Register, Vol. 72, No. 79, Wednesday, April 25, 2007
[4] *http://www.epa.gov/ttn/chief/eidocs/PM10eir.pdf*
[5] *http://www.epa.gov/ttn/chief/eiinformation.html*
[6] 1996 Air Quality Criteria for Particulate Matter, Vol. 1, EPA/600/P-95-001aF, (Washington, D.C.: U.S. Environmental Protection Agency, April 1996), Sections 5.2.1, 5.5.1, and 5.5.3

For PM10 nonattainment areas, EPA identifies three basic kinds of inventories that States may need to develop under the CAA: base year inventories, periodic inventories, and modeling inventories. Presented below is EPA's description of the information required for each of the inventory submittals and related IPP requirements.

Base Year Inventory – This is the primary inventory from which all other inventories are derived. All inventories are required to be consistent with data provided in the base year inventory. Section 172(c)(3) of the CAA requires States to ensure that this inventory is comprehensive, accurate, and current for all actual emissions of PM10. The base year inventory must include emissions from all point, area, and mobile sources.

Periodic Emissions Inventory – The CAA states that the emission inventories may be periodically updated as deemed necessary by the Administrator. A periodic inventory may be the consequence of RFP requirements, a maintenance plan for an attainment area, or for other reasons deemed necessary by EPA. The Administrator has determined that states should submit statewide annual and three-year cycle inventories for PM10 and PM2.5.[7]

Modeling Emissions Inventory – The modeling emissions inventory may be used as a tool for a number of purposes, including model performance evaluations, projection to future years, evaluation of the impact of rulemaking, evaluation of control measures and technology, receptor modeling reconciliation, and determination of design concentrations. One of the major roles for modeling inventories is for use in attainment demonstrations. Modeling inventories can be based upon either allowable or actual emissions, depending on the purpose of the modeling. For instance, modeling inventories should be based on the actual daily emissions for model performance evaluation. For control measure evaluations and the attainment demonstration, the modeling emission inventory should consist of allowable emissions for the base year and projected allowable emissions for the attainment year. The phrase "allowable emissions" is a term of art related to permitting and modeling the impacts of stationary sources. The bulk of emissions here are fugitive emissions that are not subject to a stationary source permitting program—for those emissions, base year "allowable emissions" are actual emissions and attainment year "allowable emissions" will reflect base year actual emissions adjusted for the projected control efficiencies of emission reduction measure commitments.

As will be discussed later in this Plan, the emissions inventories to be used in attainment demonstrations will be design-day-specific and specific to the modeling domains computed separately for each design day and monitoring site. None of the modeling domains covers either the entire central Pinal County PM10 or PM2.5 nonattainment areas. At least under stagnation and moderate wind conditions, the spatial and temporal variability in PM10 and PM2.5 exceedances demonstrates that sources within a few miles of each violating monitor are responsible for exceedances, not the totality of sources contained within the boundaries of the nonattainment areas. However, to the extent that land utilization patterns are relatively homogenous across the relevant area, modeling

[7] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, EPA-454/R-05-001, August 2005, *http://www.epa.gov/ttn/chief/eidocs/eiguid/eiguidfinal_nov2005.pdf*

inventory analyses are expected to fairly represent similar conditions across the nonattainment area. As a result, emission inventory preparation under this plan will focus on the modeling needs of the various attainment demonstrations, and inventory improvements developed in these domains will be extended to the applicable source categories in the baseline inventories for the two nonattainment areas. However, lower priority will be given under this Plan to improving other emission inventory categories in the nonattainment area baselines that do not benefit the modeling domain inventories.

IPP Requirements – For base year inventories, EPA requires States to prepare a brief IPP that specifies how they intend to develop, document, and submit their inventories. The plans provide States the opportunity to notify EPA how they plan to compile the required inventories and to allow EPA to provide important feedback to prevent the use of approaches that are not consistent with the EPA requirements.

In addition to technical data, the IPPs should contain a schedule showing when the State plans to submit the draft and final inventories to EPA. If the State plans to submit an inventory in component pieces (e.g., point source component, area source component, etc.), the IPP must clearly make this distinction and indicate draft and final submittal dates for each component. The final submittal dates should be consistent with the PM10 emission inventory requirements. A complete draft inventory is required to be submitted to the EPA Regional Offices and the EPA headquarters within 12 months after the date that an area is designated nonattainment. The IPP is also required to detail the year chosen as the base year for the inventory, and explain the basis for the selection.

Source Category Requirements – States are required to define how all pertinent emission sources will be identified and located.

Point Sources – States are required to describe how point source activity levels and associated parameters will be developed, and how these data will be used to calculate emission estimates. States must also discuss how and when statewide point source reporting to the EPA will be conducted and how it will be coordinated with reporting for area and mobile sources. States must indicate whether rule effectiveness was applied and, if it was, the basis for determining control efficiencies. States must describe any source surveys that are planned, and if they intend to use existing data contained in the Emissions Inventory System (EIS), individual State emissions systems, or State permitting files.

Area and Mobile Sources – States must explicitly identify in the IPP which source categories will be addressed and which will not be addressed (with justification for exclusion). For included categories, the plan must indicate what calculation methods will be used to estimate emissions. If a State plans on using EPA's inventory guidance for all categories, the IPP must summarize the EPA guidance and contain reference(s) for the guidance. If the EPA guidance offers alternative methods for a category, the IPP shall clearly indicate which method the State intends to use in its inventory. Particular emphasis shall be given to categories for which the State plans to use an approach other than that recommended in the EPA guidance. Any major assumptions that may affect the development of emission estimates in a category must be clearly stated. The IPP must

also identify the sources of activity data, whether rule effectiveness will be applied (and how it was determined if applied), and the basis for determining control efficiencies.

For on-road mobile sources, the IPP must include a discussion of how the State intends to develop vehicle miles traveled (VMT) estimates, and how PM10 emission factors for mobile sources will be determined. EPA's original guidance required the use of a mobile source particulate model (PART5), which has been superseded by AP-42 guidance for paved and unpaved roads.

The IPP must also clearly describe how the State plans to present, document, and submit the inventory to the EPA. The types of documentation that will be provided and the form of this documentation must be described to the extent that EPA can judge if it would be satisfactory for inventory review purposes. The IPP shall specify the written and computerized methods that the State plans to use to compile and submit its emission data. The State must contact its EPA Regional Office to determine computerized data submittal and format requirements, and must describe in its IPP how its data system (e.g., AIRS, State system) will be used to submit the data to EPA.

States are required to submit Quality Assurance (QA) plans as an initial step in their inventory development work and receive EPA approval on their plans early on in the process. The QA plans must be submitted as part of a State's IPP. The content and general form of QA plans must be consistent with previously issued guidance. This plan shall describe the overall QA program that the State intends to use during the compilation of the inventory.

In summary, PM10 IPPs are required to be concise, and provide only as much detail as is necessary to communicate to the agency how the State intends to develop and present its inventory. However, the document must contain sufficient information to enable the EPA to make a judgment that the State's intended inventory approach is sound and consistent with EPA's guidance and requirements.

For PM2.5 nonattainment areas, the guidance is rather general and stresses the need to begin with a description of inventory objectives (e.g., geographic area covered, base year, pollutants included, temporal resolution, etc.). It states that the IPP should contain the following sections that address portions of the inventory:

- Introduction,
- Point Source Inventory,
- Area Source Inventory,
- Nonroad Mobile Source Inventory,
- Mobile Source Inventory,
- Biogenic Source Inventory,
- Documentation Approach, and
- Quality Assurance Plan.

The primary source of guidance referenced for developing an Inventory Preparation Plan (IPP) and related Quality Assurance Plan (QAP) is EPA's Emissions Inventory Improvement Program (EIIP) documentation. Table 1-1 presents an overview of the IPP and QAP planning activities recommended under EPA's EIIP guidance.

Table 1-1
Inventory Preparation Planning and Quality Assurance Planning Steps

Inventory Preparation	Quality Assurance
1. Preliminary Planning Activities:	
1. Define purpose and scope of inventory 2. Define organization and staffing roles (including agency <u>and</u> contractor roles)	3. Define and document data quality objectives 4. Identify quality assurance (QA) coordinator and assign QA responsibilities to inventory staff
2. Prepare Technical Work Plan:	
5. Identify geographical area 6. Delineate pollutants to inventory 7. Establish point/area source cutoffs 8. Prioritize source categories for inclusion in inventory 9. Prioritize data sources 10. Delineate emissions estimation procedures	11. Prepare QA plan concurrently with or after technical work plan 12. Document data-gathering methods in QA plan 13. Select QA procedures to be used 14. Determine indicators that will be used to measure data quality
3. Prepare Inventory:	
15. Data collection 16. Data handling 17. Estimate emissions 18. Document inventory development activities	19. Follow data handling procedures as documented in QA plan 20. Conduct routine QA activities and independent audits 21. Document QA steps coinciding with inventory development activities
4. Inventory Reporting:	
22. Document methods, data sources, adjustments 23. Discuss sources excluded and explain why 24. Present estimated emissions	25. Prepare QA audit reports 26. Document QA findings and resolution of problems 27. Discuss QA in final inventory report and prepare separate QA report
Source: EPA EIIP Document Series, Volume VI: Chapter 2	

The guidance and "blueprints" for inventory development specified in the EIIP are necessarily broad and comprehensive so that they can be used and adopted by individual States based on prioritized objectives, staffing, and resources. Some of the guidance, however, demands substantial rigor. For example, the QAP guidance in the EIIP provides for an extremely high degree of review, auditing, and relative "scoring" or ranking of the emission estimation, spatial and temporal allocation, and forecasting methodologies and data sources for each individual emission source in an inventory. For agencies with significant budgetary resources and staff that are developing rigorous, Level I-type[8] compliance inventories in industrialized urban areas, the high degree of quality assurance (QA) auditing, ranking, and documentation suggested in the EIIP guidance is appropriate. Since these conditions do not apply throughout the central Pinal County nonattainment area, judgment will be applied in establishing data collection, analysis, and related QA requirements.

Each of the steps outlined in Table 1-1 was considered in the development of this IPP. Presented below is a brief review of the issues considered and addressed within the four main categories of effort.

Preliminary Planning Activities – The work plan for this effort must define the purpose and scope of the inventory. It must address the development of source-specific estimates for PM10 and PM2.5 and precursor emissions. Where options are available for the development of emission inventory estimates for specific source categories, these options are identified and discussed. Since the selection of inventory methodologies will be made subsequent to approval of this IPP, only limited information on the organizational structure and assigned staffing roles relative to inventory preparation is contained in this IPP.

Technical Work Plan Development – While EPA guidance calls for the development of an emissions inventory system that will cover all PM10 and fine particulate pollutants and precursors, ADEQ- and PCAQMD-sponsored CMB studies[9] have shown that PM10 and PM2.5 peaks are dominated by crustal source emissions. For this reason, the inventory will focus on crustal sources and not secondary aerosol precursor emissions.

Prepare Inventory – Activity data will be collected for key emission sources following procedures outlined in this report. The activity data will be combined with emission factors also outlined in this report to prepare representative source specific emission estimates. Tests of alternate high wind emission estimates will be conducted to determine which method provides a more representative estimate of concentrations recorded at selected monitoring sites. QA procedures outlined in Table 1-1 will be followed to ensure that emission estimates are reliable and can be replicated.

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[8]The EIIP guidance categorizes emission inventories into four groups (Levels I through IV) based on uses, requirements, and rigor or accuracy. A Level I inventory refers to that developed for enforcement, compliance, or litigation uses with a high degree of accuracy.

[9] Analysis of PM2.5 Exceedances in Pinal County Arizona: Demonstration that PM2.5 Concentrations are Driven by Local Sources of PM10 Near the Cowtown Monitor. *http://pinalcountyaz.gov/Departments/AirQuality/Documents/Other%20EPA%20Regulatory%20Actions/CowtownTechnicalWhitePaper.pdf*

Inventory Reporting – The final steps in Table 1-1 describe the reporting practices and documentation of the emission inventory. These elements include the following:

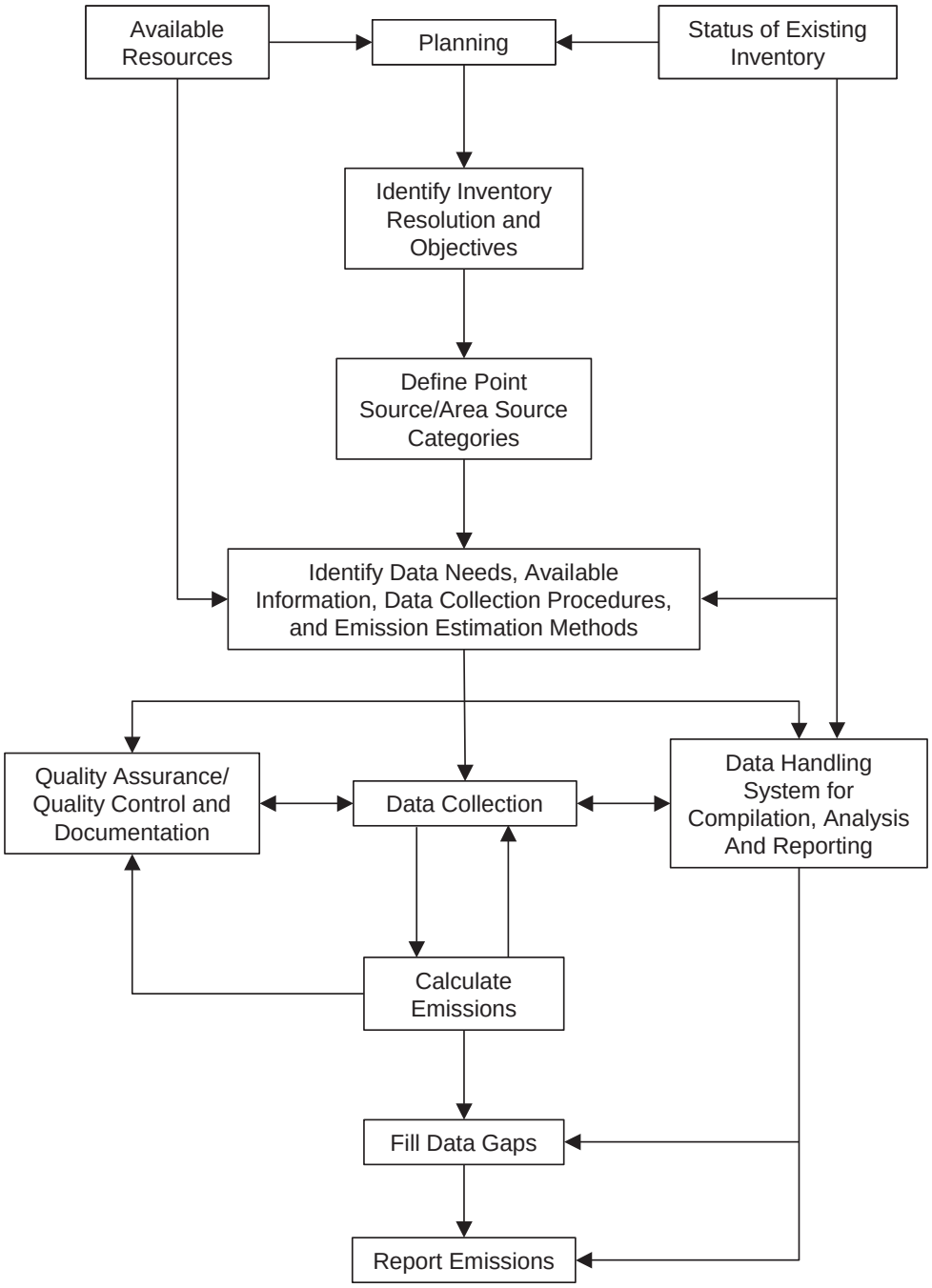
- Documentation of methods and data sources (e.g., MOVES, local travel model outputs, etc.);
- Discussion and explanation of sources excluded from the inventory (e.g., space heating emissions, etc.); and
- Summary reports of the emissions inventory (for both AQ and inventory submittal purposes).

Figure 1-1 illustrates an overview of the processes and issues that were considered in the development of this document. As previously discussed, these processes were largely followed in the development of PM10 SIPs and criteria pollutant inventories elsewhere in Arizona. The challenge is adapting and prioritizing those processes for the central Pinal County nonattainment area and selected modeling domains.

1.2 Report Organization

Following this introduction, Section 2 provides an initial assessment of the diurnal trends and relationships between PM10 hourly averages and meteorological parameters at select Pinal County monitoring stations conducted to gauge the influence of local versus regional sources at these sites. Section 3 presents a summary of design day and modeling domain selections for monitors determined to be representative of exceedance conditions within the nonattainment area. Section 4 presents a review of the emission inventory development procedures for key emission source categories and a summary of data available to characterize activity and conditions within the nonattainment area and selected modeling domains. Section 5 presents a summary of QAPs to be implemented to ensure quality assurance requirements are satisfied.

Figure 1-1
Overview of Inventory Preparation



Source: "Introduction to Stationary Point Source Emission Inventory Development," Emission Inventory Preparation Program, May 2001.

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2. INITIAL ANALYSIS OF BASE YEAR MONITORING DATA

As the first step in developing site-specific, short-term inventories to support attainment analyses, an initial assessment of the diurnal trends and relationships between PM10 hourly averages and meteorological parameters at select Pinal County monitoring stations was conducted to gauge the influence of local versus regional sources at these sites. The monitoring stations at which hourly data were available for this assessment were Cowtown, Stanfield, Casa Grande/Airport, and Pinal County Housing.[10] Prior analysis by both the Arizona Department of Environmental Quality (ADEQ)[11] and the U.S. Environmental Protection Agency (U.S. EPA)[12] demonstrated that windblown dust, generated during high wind events caused by thunderstorm outflows and frontal system passages, was responsible for some of the higher 24-hour average PM10 recordings. This subsequent assessment was designed to determine the prevailing directions from which windblown dust originated and whether higher 24-hour readings were also occurring during low wind conditions and, if so, the relative proximity of sources that might be contributing to these concentrations.[13]

The assessment was conducted in two stages. In the first stage, single-variable analyses were used to rank hourly PM10 averages by wind speed bin and examined diurnal profiles of PM10 hourly averages at each of these four stations. In the second stage, we used two-variable analyses to compute hourly PM10 averages by combinations of wind speed, wind direction, and hour of the day to develop more information about the relative locations and contributions of potential source categories contributing to periods of high, and low, PM10 concentrations at these stations. The data used in these analyses were collected between January 2006 and December 2008 at the Cowtown and Pinal County Housing sites, between March 2007 and December 2008 at the Casa Grande/Airport site, and between July 2007 and December 2008 at the Stanfield site. Because of the influence of very sporadic, but very high, hourly PM10 concentrations, we removed hours during which the average 1-hour PM10 concentration exceeded 10,000 $\mu g/m^3$ from

[10] Although limited hourly data were also available at the Maricopa and Combs School monitoring sites, these data were not included in the initial analyses as the frequencies and magnitudes of PM10 exceedances were lower at these sites, and the control strategy capable of achieving attainment at the initial study sites was believed to be capable of achieving attainment at the Maricopa and Combs Schools sites also.
[11] Boundary Recommendations for the Pinal County 24-hour PM10 Nonattainment Area, Arizona Air Quality Designations Technical Support Document, Arizona Department of Environmental Quality, March 15, 2010
[12] Pinal County, Arizona Area Redesignation for the 1987 24-hour PM10 National Ambient Air Quality Standard, Technical Support Document, U.S. Environmental Protection Agency, Region 9, Sept. 21, 2010
[13] These initial analyses were conducted prior to final selection of design days and monitoring sites.

the analysis to prevent the resulting statistics from being unduly influenced by outlier data.[14]

2.1 Cowtown

Single-Variable Analyses – Table 2-1 summarizes hourly PM10 average and maximum concentrations ranked by wind speed bin. A review of these data suggests several relationships that shed light on source contributions. First, the combination of the relatively uniform magnitude of PM10 average concentrations between 0 and 7 meter-per-second (m/sec) wind speeds—at levels in excess of the federal 24-hour standard of 150 µg/m^3—and the very high maximum concentrations across this range indicates that local sources produce significant and persistent emissions of PM10. The elevated PM10 average of 536 µg/m^3 found in the 8 to 9 m/sec wind speed bin, with an observation count of 105 hours (0.40% of all hours), suggests that high wind conditions are also responsible for a portion of the 24-hour PM10 exceedances at this site. The relatively high average PM10 concentration in this wind speed bin, in comparison to those of other wind speed bins below 8 m/sec, suggests that this is the threshold velocity for a land use category or soil type producing significant emissions upwind of the station.

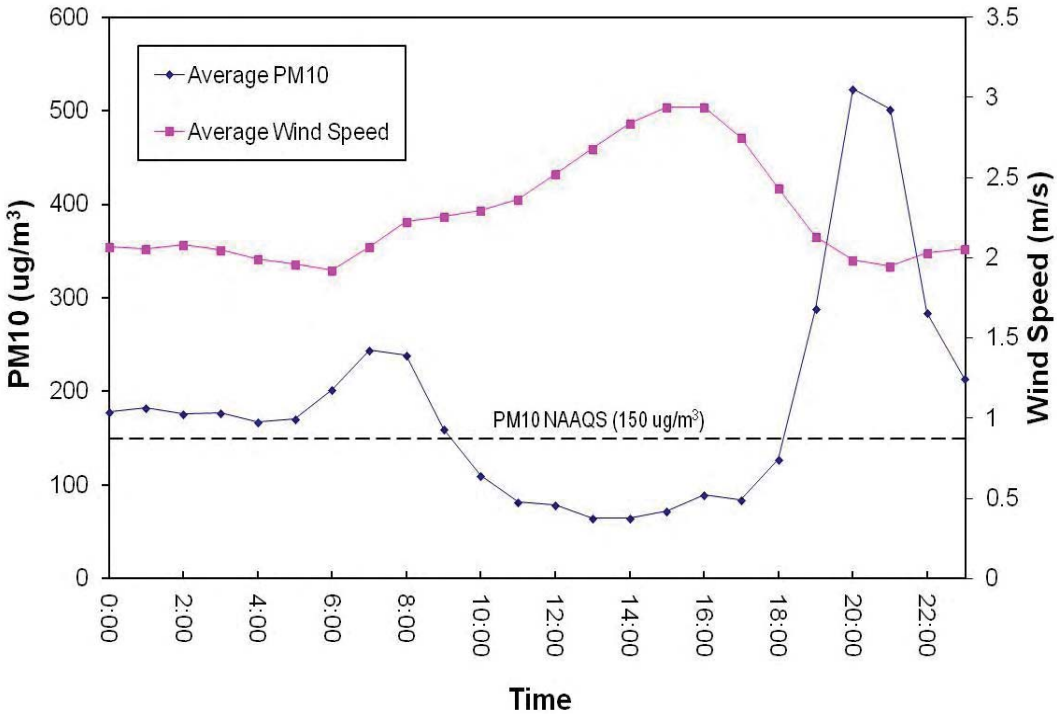
Table 2-1
Cowtown Hourly Average and Maximum PM10 – All Hours
(No Outliers)

Wind Speed Category (m/s)	Observation Count	Average PM10	Max PM10
0~1	3,018	216	6,373
1~2	10,657	196	7,511
2~3	6,655	171	6,175
3~4	2,859	159	7,300
4~5	1,301	146	5,316
5~6	667	146	3,182
6~7	391	195	3,083
7~8	222	292	4,047
8~9	105	536	4,989
9~10	33	403	2,250
10~11	9	446	1,084
11~12	1	2,328	2,328
12~13	1	1,046	1,046
Total Count	25,943	N/A	N/A

[14] At Pinal County Housing, Casa Grande and Stanfield, the hours exceeding 10,000 µg/m^3 were consistently associated with hourly average wind speeds exceeding 12 mph. The Cowtown concentrations exceeding 10,000 µg/m^3 were predominately at night.

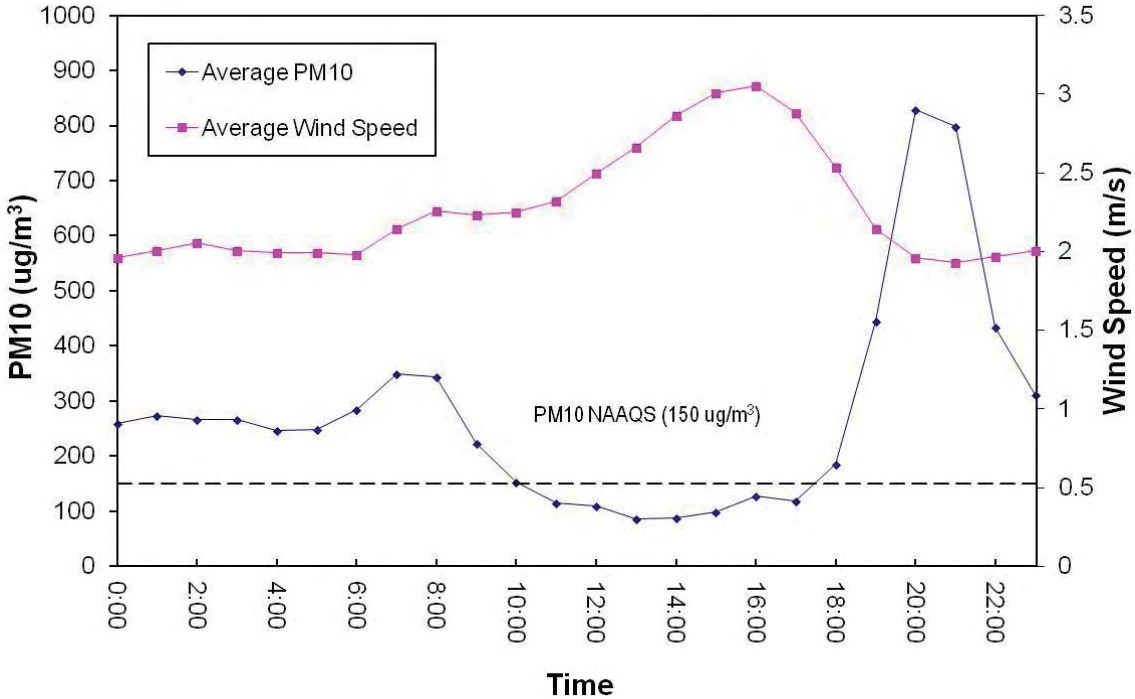
The diurnal distribution of hourly PM10 averages at Cowtown was examined, but did not reveal significant insights with respect to potential source contributions. The diurnal distribution for this site is shown in Figure 2-1. The early-morning smaller peak between 0600 and 0900 hours and much higher peak in PM10 between 1800 and 2400 hours may result from several different phenomena that warrant evaluation in the preparation of the emission inventory. These phenomena include, but are not limited to, the timing and severity of nocturnal inversions at this site (which would concentrate emissions from groundlevel sources in shallow mixing layers) and diurnal variations in mechanical source activity (such as traffic flows on nearby paved and unpaved roads).

Figure 2-1
Cowtown Hourly PM10 Averages by Time of Day, All Hours (No Outliers)



A refinement of the diurnal distribution pattern at Cowtown, limited to exceedance days, is shown in Figure 2-2. This time plot again shows a low early-morning peak in PM10 and a corresponding evening peak between 1800 and 2400 hours.

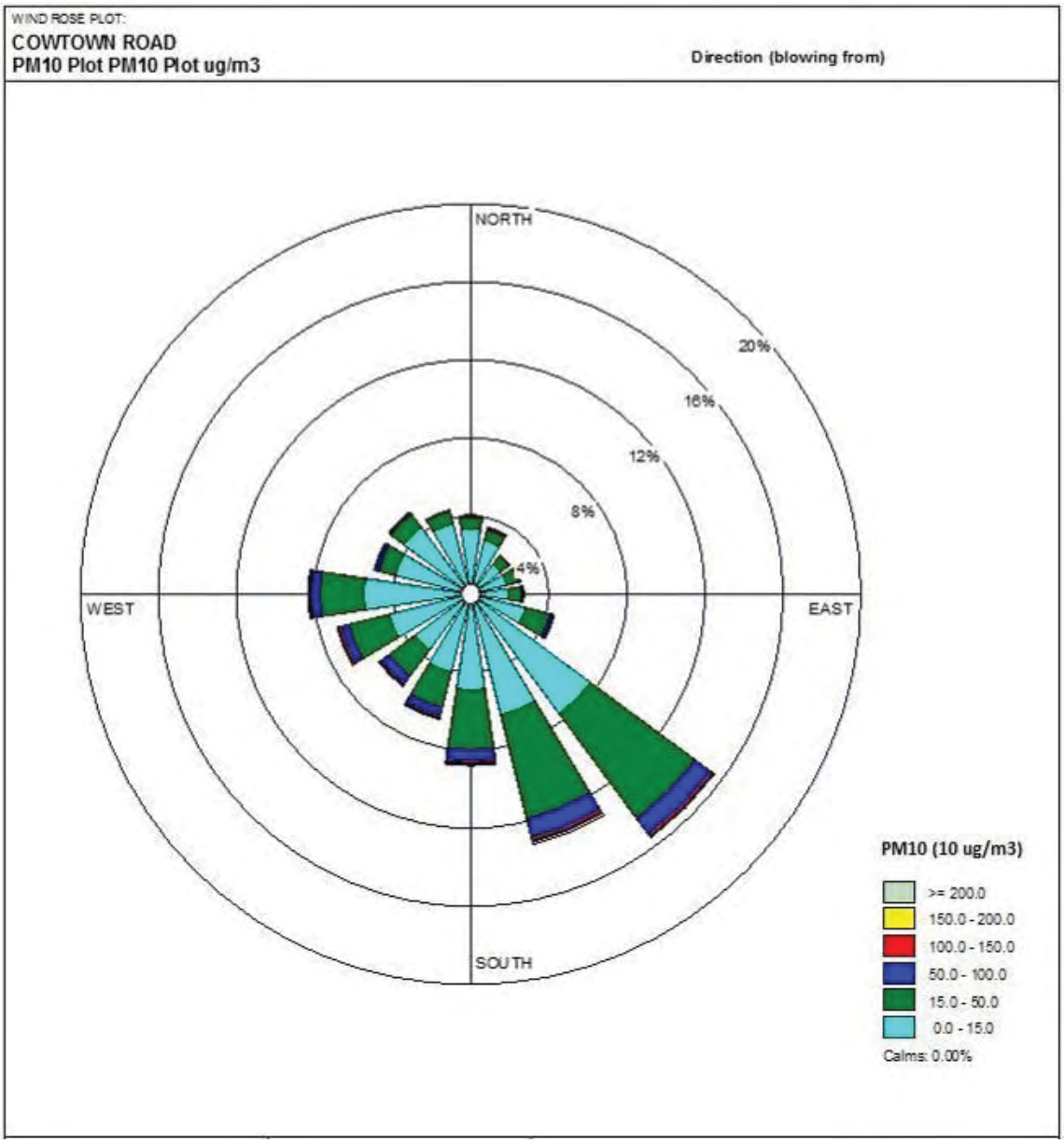
Figure 2-2
Cowtown Exceedance Day Hourly PM10 Averages by Time of Day, All Hours (No Outliers)



A PM10 rose was constructed of the hourly PM10 and wind direction data from the Cowtown monitor using techniques originally developed to generate wind speed and direction roses. This rose is shown in Figure 2-3.[15] The lengths of wind direction radii reflect the fractions of the total number of hours during the monitoring period that the wind blew from the directions to which the wedges point. This plot shows that the prevailing winds at Cowtown are from the southeast, with the southwest quadrant contributing the next highest fraction of wind hours. PM10 roses limited to exceedance days and hours of PM10 exceeding 150 µg/m^3 show very similar patterns (not shown in the figures), suggesting that the sources most significantly impacting this monitor lie in the same arc as the prevailing winds.

[15] Because of limitations of the windrose software used to generate this plot, the values displayed in the legend in the lower right need to be multiplied by 10 to reflect the ranges of PM10 concentrations on which this plot is based. For example, the light green band of PM10 concentrations represents hours exceeding 2,000 µg/m^3, not 200 µg/m^3. Similar multiples should be applied to values displayed in the other PM10 roses, i.e., Figures 2-11, 2-12, 2-17, and 2-21.

Figure 2-3
Cowtown Hourly PM10 Rose



Two-Variable Analyses – The first two-variable analysis of Cowtown data grouped hourly PM10 averages by wind speed and wind azimuth (direction). Wind speed data were grouped in bins spaced 1.0 m/sec apart, and wind azimuth data were grouped in bins spanning 10 degrees of compass arc. The hourly Cowtown PM10 averages by wind speed and azimuth are presented in Figure 2-4. In this figure and the other two-variable tables, data are color-coded to indicate highest (red) through lowest (dark green) values to highlight data clusters. The numerical ranges included in each color band are shown in a legend just below each data table.

In Figure 2-4, the presence of highest PM10 averages at 0-1 m/sec wind speed and multiple wind directions suggests that significant nearby sources impact the monitor during stagnant wind conditions. Wind meander that occurs during these very low wind speeds may be responsible for the multi-directionality of high averages, meaning that significant sources may not lie in these directions, but rather that emissions from any significant nearby sources approach the monitor from a variety of directions as a result of winds meandering between source and monitor. The cluster of moderate PM10 averages at 1-2 m/sec wind speeds between 140 and 260 degrees suggests that the most significant nearby sources lie within this quadrant. This figure also shows a high PM10 cluster at 7 to 10 m/sec wind speeds and 240 to 290 degrees wind direction. This cluster suggests that disturbed soils lying upwind of the monitor within this wind direction arc produce high impacts at the monitor at higher frequencies than disturbed soils in other directions during high wind conditions. This tendency may be due to soils having lower threshold velocities for generating windblown dust in this arc, soils being more continuously disturbed, or greater quantities of deposited dust available for re-entrainment in these upwind directions.

A subsequent analysis examined the relationship of peak hour PM10 concentrations to the same wind speed and direction bins. The resulting table of values is presented in Figure 2-5, showing that high PM10 maxima at 1 to 3 m/sec wind speeds occur in most wind directions, suggesting the presence of multiple high-strength episodic sources surrounding the monitor. Because episodic sources generate high emission rates for short periods of time, initial identification of these sources will depend more on interviews of people who spend time in areas near the monitor than on further statistical analysis of the hourly PM10 and meteorological data. Once potential candidate sources are identified, followup inquiries will be made of any parties responsible for source operation and emission rates will be estimated using reverse dispersion modeling techniques.

Figure 2-4
Cowtown Hourly PM10 Averages by Wind Speed and Azimuth, All Hours (No Outliers)

Cowtown	Hourly PM10 Averages by Wind Azimuth (degrees) and Speed (m/sec), All Data (No Outliers)													
Average of	Column													
Row Lab	0	1	2	3	4	5	6	7	8	9	10	11	12	Count Subt
0	183	109	50	80	320	88		18						493
10	111	138	84	102	85	93	143		25					463
20	84	122	88	54	294	224	191	276						433
30	338	102	99	62	116	107	298	2279	23					381
40	96	134	90	154	84	26	239	33	1307					326
50	455	123	168	217	82	22	25	255						251
60	147	151	104	98	104	99	84	108	550		22			267
70	132	156	157	99	137	122	146	368	136	151	475	365		328
80	432	167	124	80	100	94	133	197	182	330				339
90	142	156	72	149	71	159	127	233	146	98				281
100	136	144	93	99	283	146	83	253	102	403	741			334
110	151	186	127	100	128	100	86	188	95		362			460
120	242	228	168	134	109	74	137	459	186	1214				717
130	494	188	172	200	223	187	246	27	70	158				1580
140	91	253	233	242	176	195	222	25	149		795			1982
150	548	307	235	213	150	148	99	145		131	159			1759
160	166	306	242	188	169	98	190	129	65	2261				1445
170	121	302	200	176	150	199	95	47	1189					1253
180	500	278	190	147	134	141	171	165	31	66				976
190	90	254	225	163	209	146	115	98	58	58	776			822
200	364	261	179	166	181	84	602	127	279	357	716	24	1046	799
210	118	292	184	143	136	95	273	140	174				2328	744
220	171	263	248	161	323	87	113	238	154		440			635
230	135	244	249	229	228	197	360	208	769					679
240	136	314	246	224	177	231	150	261	560	508				736
250	396	254	200	184	134	128	179	96	786					844
260	246	284	179	180	119	130	180	206	685	386	392			1011
270	464	234	134	184	163	130	163	312	528	1558	2055			976
280	163	160	150	145	137	124	137	466	422					784
290	125	180	105	115	88	131	220	323	155	0				596
300	223	144	129	93	79	117	162	599			51	21		564
310	202	144	87	83	149	115	129	130	2803		24			609
320	139	126	70	49	70	119	43	161	217					571
330	297	115	70	73	118	214	42	409	612					547
340	135	101	66	60	78	47	17		255					515
350	126	95	55	96	102	36	37	33	83	53				474
360	124	102	53	77	285	42	374		58	61				233
Count Subt	662	7866	9499	4322	1848	960	510	294	159	60	22	3	2	26207
Color Scale	0	50	100	150	200	300	400							

Figure 2-5
Cowtown Maximum Hourly PM10 Concentration by Wind Speed and Azimuth, All Hours (No Outliers)

Cowtown	Hourly PM10 Maxima by Wind Azimuth (degrees) and Speed (m/sec), All Data (No Outliers)												
Max of PM	Column												
Row Lab	0	1	2	3	4	5	6	7	8	9	10	11	12
0	3703	879	276	287	1468	118		18					
10	481	4262	916	1132	492	173	283		31				
20	493	3639	1364	439	3604	1437	995	1041					
30	1273	625	1903	941	488	497	929	4047	23				
40	448	1436	1825	2535	837	72	887	33	4722				
50	2156	1642	6068	2513	475	80	38	372					
60	310	1921	722	712	631	531	288	234	550		22		
70	516	3264	1650	582	1185	686	818	3083	349	484	718	365	
80	2308	4830	917	550	414	548	707	1017	794	976			
90	335	1682	269	552	632	916	741	666	233	134			
100	242	1629	734	574	2776	847	184	253	102	1336	1296		
110	838	3482	874	766	1132	361	217	188	119		362		
120	1099	3547	1903	833	807	271	346	1020	349	1214			
130	1236	3979	1954	2005	5316	735	1009	39	89	158			
140	253	3648	1851	6175	553	1400	652	65	252		795		
150	4391	3493	4927	2958	825	954	253	264		262	213		
160	467	6373	3921	1414	1155	463	640	346	101	2261			
170	365	3228	3565	864	1217	1309	442	123	4989				
180	2863	4429	2365	1730	822	464	814	732	71	90			
190	548	5066	4223	2319	1789	439	286	301	118	206	2250		
200	1894	5580	2989	1049	1039	451	3182	278	1199	1166	1084	24	1046
210	368	3739	5457	2274	1058	318	1627	396	415				2328
220	819	6137	6439	1587	2462	236	361	352	214		440		
230	355	1789	6140	3307	1511	547	1269	373	1028				
240	323	4607	3095	7300	1285	1090	475	1249	2901	508			
250	1274	4369	1821	3713	932	454	546	346	1513				
260	684	4887	2871	3329	619	485	1014	1130	4102	787	392		
270	2476	3776	1997	2355	2677	643	911	1615	1975	2900	2055		
280	641	1245	7511	2065	875	1306	557	2400	1607				
290	234	3127	3270	1527	938	584	622	1335	155	0			
300	716	1763	3552	2492	693	520	201	599			51	21	
310	752	2591	1053	639	966	350	255	406	4658		31		
320	566	1290	1236	258	433	481	162	369	393				
330	1086	3714	820	404	500	725	42	409	612				
340	419	1649	741	426	510	209	29		255				
350	483	967	676	1590	864	100	195	59	102	53			
360	281	802	418	429	632	63	723		58	83			
Color Scale	0	100	200	400	800	1000	1500	2000					

An analysis that accounts for both PM10 average concentrations and the number of hours contributing to each average was performed by grouping sums of hourly PM10 concentrations by wind speed and direction. The results of this analysis are displayed in Figure 2-6. This plot reflects the wind speeds and azimuths associated with the highest cumulative PM10 impacts at the monitor over the period of the data record. As a rough indicator, high PM10 sums within a single wind speed range can be attributed to sources lying along the upwind direction up to X miles of the monitor, where X = (upper end of wind speed range, m/sec)* (2.24 mph/m/sec). Based on this approach, for example, sources that impact the monitor when wind speeds are between 0.0 and 1.0 m/sec are assumed to lie primarily within 2.2 miles of the monitor (= 1.0 m/sec * 2.24 mph/m/sec). Figure 2-6 shows a hot spot at wind speeds between 2.0 and 3.0 m/sec and within the arc

of 140 to 160 degrees southwest of the monitor. Figure 2-7 shows an aerial photograph from May 2011 of the Cowtown monitor with a radius extending up to 6.7 miles away on an azimuth of 150 degrees. Emission sources anywhere along this line are potentially responsible for the higher PM10 sum shown in Figure 2-6 for this wind speed and direction.

Figure 2-6
Cowtown Sum of Hourly PM10 by Wind Speed and Azimuth, All Hours (No Outliers)

Cowtown	Sum of Hourly PM10 by Wind Azimuth (degrees) and Speed (m/sec), All Data													
Sum of PM	Column													
Row Lab	0	1	2	3	4	5	6	7	8	9	10	11	12	Grand Total
0	55007	9243	3770	1599	2561	176		18						72374
10	1548	27522	13203	6306	1872	187	429		74					51141
20	925	22156	13039	2719	5881	2464	1143	1378						49705
30	3040	19158	10398	2249	2210	1178	2978	4559	23					45793
40	1442	19074	8552	5066	1846	155	1913	33	5227					43308
50	3184	14069	12789	5857	1318	110	75	765						38167
60	1616	17954	5420	2745	2400	1979	671	432	550		22			33790
70	926	14678	8792	2667	4920	3176	5706	7735	1496	1204	951	365		52616
80	3022	19519	7051	2410	2191	3006	2918	5135	2736	3635				51621
90	1132	19183	4767	3433	1345	2073	1654	2097	730	195				36609
100	1087	18776	10611	3269	5947	1457	831	253	102	1611	1481			45424
110	1361	30549	18730	6587	5514	1897	687	188	190		362			66064
120	1692	41704	44670	22008	6767	1471	960	2295	371	1214				123151
130	2963	52005	88710	106623	43293	7491	1475	107	211	158				303035
140	732	99430	195506	134749	21174	9157	1998	124	598		795			464263
150	4933	134309	201788	65853	12295	6196	1089	724		262	318			427767
160	1165	144369	157551	40770	8458	2648	2280	775	194	2261				360470
170	1336	140942	108806	22901	7824	4786	1238	375	5943					294150
180	6504	110844	69829	13639	4963	2828	3247	3295	153	133				215433
190	1440	85629	67450	13513	7513	2044	1149	1080	292	351	3103			183563
200	4001	77450	52500	14276	7222	2515	9637	888	2233	2144	2148	24	1046	176082
210	1302	72717	53565	11704	6656	2764	3279	1535	1564				2328	157414
220	1705	57089	65759	11426	10010	1830	1354	715	616		440			150945
230	2027	55864	70839	21096	5476	3738	3240	833	1538					164652
240	1491	65715	64787	29807	8337	4856	3593	4432	5600	508				189125
250	5143	39930	56273	34430	14490	6271	5002	1250	5503					168292
260	1473	37465	48395	42321	19134	14445	8820	4736	9593	3089	392			189863
270	7420	35111	31332	37581	27274	13401	8312	10921	6331	4675	2055			184414
280	1627	20269	25683	26603	17127	10673	6556	10723	4225					123485
290	751	25923	19687	14200	5886	5508	4405	1613	155	0				78127
300	1782	25340	29063	8497	3080	2337	325	599			51	21		71093
310	2015	30488	22085	7784	2836	923	257	652	8410		49			75498
320	1672	25388	17292	3024	1404	1542	304	804	651					52081
330	3863	24959	16820	4294	1175	856	42	409	612					53028
340	1480	22258	14677	2321	1165	285	35		255					42474
350	1389	19317	10534	3460	1425	181	261	99	166	53				36885
360	495	10747	4407	1859	2280	85	1122		116	123				21233
Grand Tota	134690	1687141	1655130	739644	285264	126688	88983	71576	66456	21614	12166	410	3374	4893136
Color Scale	0	40000	80000	120000	160000	200000								

Figure 2-7
Example Cowtown PM10 Hot Spot Source Corridor

Diurnal trends in PM10 concentrations were assessed by tabulating hourly PM10 averages by wind azimuth and hours of the day. The results, presented in Figure 2-8, show a cluster of high PM10 averages during 1900 to 2300 hours in the wind directions of 100 to 300 degrees. As noted above (on page 12), these elevated concentrations could be due to the onset of strong nocturnal inversions as ground heating ceases after sunset or to variations in diurnal activity rates of contributing mechanical sources. The presence of moderate PM10 averages between 0000 and 0600 hours and 120 to 190 degrees from the monitor suggests nocturnal mechanical sources may lie in this arc, which is also the arc occupied by the prevailing winds at this site. These impacts may also be driven by nocturnal high wind events.

Diurnal trends in PM10 concentrations were also assessed by contrasting hours of the day against wind speed bins. The results of this analysis appear in a table in Figure 2-9. High PM10 averages between 2000 and 2300 hours and 0 to 5 m/sec wind speeds again suggest the possibility that strong ground-based inversions are forming during these hours while some mechanical source activity is occurring or that significant local sources with pronounced diurnal variability are causing higher emissions during this period of the day. High PM10 averages between 1500 and 2000 hours at wind speeds between 7 and 12 m/sec suggest the predominance of late-afternoon high wind episodes that transport significant windblown dust to the monitor, possibly from thunderstorm outflows that typically occur in the late afternoon and early evening of the summer months. The cluster of moderate PM10 averages between 0600 and 0900 hours at wind speeds from 0 to 4 m/sec indicate monitor impacts from nearby sources that exhibit significant emissions from early morning activity.

Summary – The Cowtown monitor is impacted primarily by emissions from nearby sources lying between 100 and 300 degrees of the monitor and/or the presence of strong nocturnal inversions. Both of these possibilities should be the focus of emission inventory development for this site. Windblown dust generated during high wind events appears to be the next greatest source impacting the monitor. Thunderstorm outflows are suspected of producing a number of these high wind episodes. As a somewhat repeatable occurrence, these flows may follow wind trajectories that are co-axial, crossing the same source areas in transporting dust to the monitor. If further investigation of outflow back-trajectories demonstrates the dominance of a few wind directions, the emissivity of lands along these trajectories should be a focus of inventory development for this site.

Inventory Focus – The emission sources that this initial analysis points to as significant contributors to high PM10 hours at the Cowtown monitor on low wind days appear to lie within a few miles of the monitor across a fairly wide arc from the southeast to the west. Because of the frequency and magnitude of high hourly PM10 concentrations recorded at this monitor, substantial effort should be directed toward identifying all potentially significant emission sources in the area identified in this analysis and collecting activity and emission characteristic data from these identified sources. For the designated high wind design day, hourly wind back-trajectories ending at the monitor on high wind hours should be identified and the soil attributes related to windblown dust emission rates should be evaluated for each combination of land use and soil type found along these back-trajectories.

Figure 2-8
Cowtown Hourly PM10 Averages by Azimuth and Hours of the Day, All Hours (No Outliers)

Cowtown Hourly PM10 Averages by Wind Azimuth (degrees) and Hour of Day, All Data (No Outliers)

Average of	Column																							
Row Lab	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	190	232	191	162	129	169	258	246	167	165	114	50	49	67	53	56	192	57	91	156	287	438	214	163
10	102	305	83	102	47	60	104	301	163	205	88	68	49	42	42	46	64	36	74	154	917	129	128	137
20	51	119	127	73	106	199	123	143	171	273	95	103	73	45	37	37	38	212	77	331	65	267	73	73
30	119	47	49	130	78	102	147	234	370	140	106	54	45	45	33	36	24	44	91	203	478	219	117	205
40	166	72	91	65	136	114	173	160	233	121	130	55	67	29	22	37	31	51	314	289	159	100	375	141
50	81	56	66	165	78	171	117	192	201	201	110	54	67	29	51	15	722	50	66	362	145	686	45	195
60	130	195	148	72	84	110	151	179	346	148	154	86	89	36	32	40	46	31	100	169	173	93	331	138
70	205	130	65	186	100	99	179	281	349	131	115	250	88	58	120	66	45	44	153	133	432	469	213	202
80	107	208	82	73	86	117	177	198	125	176	162	102	79	141	28	80	29	29	127	120	151	804	438	80
90	69	102	69	121	134	153	197	151	225	106	67	95	136	89	107	41	197	71	183	131	229	71	176	111
100	71	117	155	85	135	153	207	100	194	110	87	61	54	67	66	34	25	68	61	233	233	267	330	201
110	161	118	140	157	110	133	164	242	233	97	72	70	61	39	35	93	31	45	95	69	320	370	213	169
120	129	148	199	186	181	123	148	172	221	133	94	76	61	59	55	52	43	173	72	284	452	424	255	132
130	155	209	195	197	167	187	209	260	255	146	96	65	48	38	46	28	136	64	148	328	392	321	202	178
140	232	247	245	231	215	197	246	285	228	166	100	69	66	35	31	54	157	247	316	188	693	340	257	258
150	219	202	195	233	215	200	237	256	256	163	142	57	54	48	37	43	58	28	90	419	683	574	345	208
160	203	228	233	207	199	188	196	285	305	178	105	91	70	39	65	49	63	54	113	482	728	476	285	230
170	183	191	181	154	171	175	206	260	235	162	129	94	53	37	35	174	58	65	96	444	647	480	346	285
180	158	162	169	176	174	175	170	272	222	148	87	70	81	52	52	50	63	74	120	479	673	520	320	195
190	149	154	134	135	212	181	205	250	256	145	103	68	151	62	63	56	54	84	190	521	585	481	357	214
200	139	174	119	124	150	217	206	229	287	182	176	68	63	80	66	111	106	101	166	312	891	664	275	178
210	259	132	156	159	137	119	257	243	187	179	148	76	60	73	84	62	105	198	100	244	751	876	345	158
220	137	109	192	136	146	199	239	190	180	194	81	59	45	62	54	119	71	87	111	649	741	529	318	193
230	221	167	106	146	125	183	284	354	313	169	106	79	63	50	58	63	133	78	195	296	625	709	270	328
240	184	137	153	199	160	188	160	246	247	192	97	107	229	102	73	148	80	103	166	407	679	655	382	407
250	196	153	97	102	120	105	207	310	191	155	146	200	92	90	80	73	153	131	165	256	397	662	211	212
260	160	117	96	163	116	155	208	186	161	226	129	125	171	121	93	90	109	148	128	203	512	386	240	200
270	118	147	73	80	135	182	153	221	259	203	98	75	154	99	144	121	123	75	153	236	420	633	437	218
280	79	128	148	165	108	183	174	202	191	135	97	72	82	88	90	134	117	115	122	354	410	387	138	120
290	243	107	151	145	60	93	91	225	202	151	88	94	71	54	64	67	94	54	103	246	576	553	190	184
300	46	54	68	60	114	106	49	101	270	178	224	80	56	49	56	43	60	56	76	238	440	1066	200	153
310	131	52	117	79	120	70	194	215	271	224	93	66	66	80	61	54	50	73	262	304	226	592	189	135
320	70	106	85	65	61	161	152	180	184	99	93	76	47	61	49	54	45	43	73	206	206	177	311	126
330	82	149	25	118	102	77	154	209	312	90	92	46	39	45	28	33	48	38	70	161	324	287	165	86
340	82	143	64	253	94	125	210	191	166	110	79	59	58	42	39	28	31	48	74	83	273	89	82	126
350	50	141	101	98	83	92	85	185	182	116	91	59	51	38	39	29	36	36	102	119	155	515	54	104
360	24	29	72	52	28	82	106	338	204	158	76	62	70	43	51	62	39	46	120	270	130	259	70	55
Color Scale	0	50	100	150	200	250	300																	

Figure 2-9
Cowtown Hourly PM10 Averages by Wind Speed and Hours of the Day, All Hours (No Outliers)

Cowtown	Hourly PM10 Averages by Wind Speed (m/sec) and Hour of Day, All Data (No Outliers)																						
Averag Colu																							
Row	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	151	190	173	171	136	123	234	240	275	149	93	68	56	77	78	58	281	83	110	228	366	518	430	146
1	168	162	155	164	169	166	196	238	249	160	107	80	75	44	41	42	46	50	116	381	611	499	322	199
2	200	190	192	183	174	174	200	238	240	157	104	66	57	50	44	45	60	50	96	232	499	542	281	224
3	158	205	196	198	179	187	223	266	208	166	94	71	96	46	55	48	73	74	108	211	359	535	222	260
4	135	119	122	171	113	172	182	252	267	124	123	102	69	82	99	98	72	113	109	222	420	385	236	168
5	108	165	82	39	111	130	149	206	201	151	121	110	106	97	92	113	135	107	138	172	298	121	176	118
6	111	56	36	72	84	15	237	306	240	188	197	145	94	105	160	108	189	178	140	192	587	464	215	121
7	67	99	121	71	208	237	265	182	223	275	153	321	202	238	130	285	219	157	320	407	857	319	146	205
8	212	120	224	108	142		83	143	234	224	198	241	526	401	219	382	343	492	2354	575	1043	950	382	75
9		825	102	283	49	51			271	190	402	117	200	27	193	202	1281	456	833	740	206	90	134	
10	312								72	519	118	31		125		692	2055	329	566	440	2250		105	1296
11											24		21											365
12																	1046	2328						
Color Scale:		0	50	100	150	200	250	300																

2.2 Stanfield

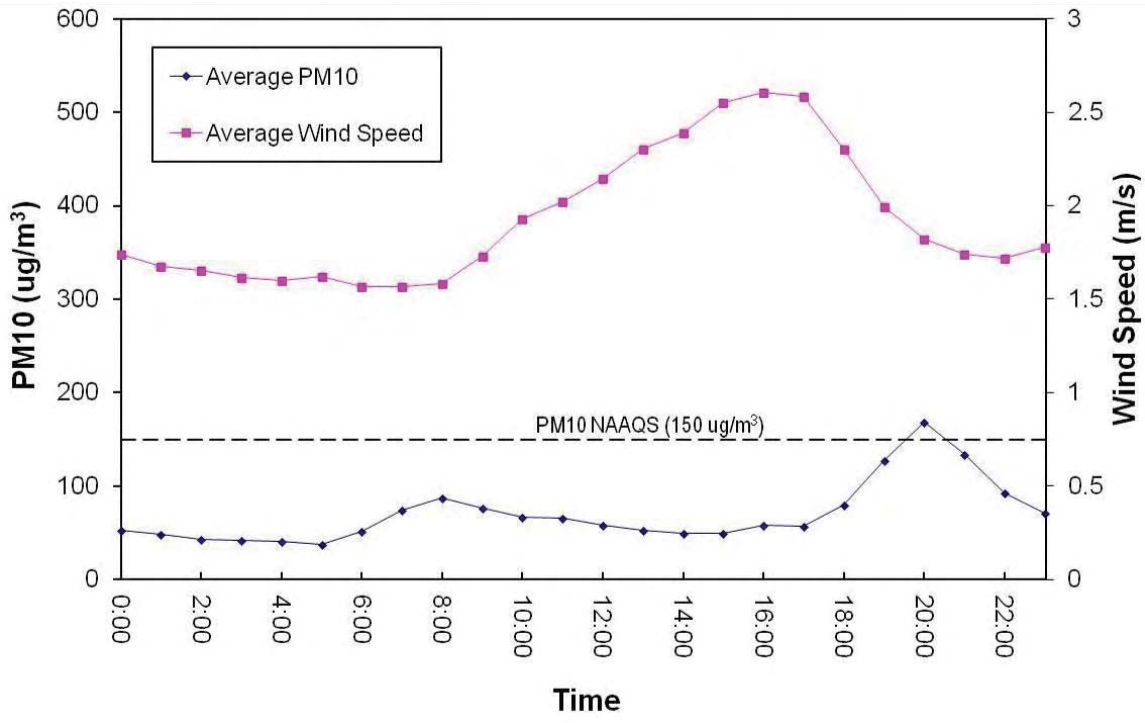
Single-Variable Analysis – Table 2-2 presents hourly PM10 average and maximum concentrations ranked by wind speed bin for the Stanfield site. This table reveals a progression of increasing PM10 average values with increasing wind speed, suggesting that there are no locally significant sources near the monitor. The averages, however, which range from 50 to 85 $\mu g/m^3$ at wind speeds between 0 and 5 m/sec, also suggest that a matrix of comparatively low emission sources surrounds the monitor, producing an elevated background level. The high maximum PM10 values at wind speeds in this same range also suggest that episodic sources periodically impact the monitor.

Table 2-2
Stanfield Hourly Average and Maximum PM10, All Hours
(No Outliers)

Wind speed Category (m/s)	Observation Count	Average PM10	Max PM10
0~1	2,225	71	1,284
1~2	6,319	62	1,820
2~3	2,336	50	1,979
3~4	802	52	1,548
4~5	475	85	1,553
5~6	252	195	4,063
6~7	136	277	3,485
7~8	46	453	2,497
8~9	20	664	1,770
9~10	8	1,196	2,528
10~11	1	2,098	2,098
12~13	1	3,384	3,384
Total Count	12,622	N/A	N/A

A plot of hourly PM10 averages by hour of the day is shown in Figure 2-10. This plot shows a low morning PM10 peak that possibly represents an initial increase in anthropogenic emissions from nocturnal levels and, after 0800 hours, a decline in these groundlevel concentrations as inversion heights increase with corresponding increases in morning ground heating from solar insolation. The evening peak in PM10 average at 2000 hours could be due to either an increase in emissions from diurnally varying sources and/or the onset of strong nocturnal inversions, as was also possible at the Cowtown monitor.

Figure 2-10
Stanfield Hourly PM10 Averages by Time of Day, All Hours
(No Outliers)



Examination of PM10 roses for this site provides limited information. An example PM10 rose is presented in Figure 2-11. This plot is limited to hours during which the PM10 concentration at the monitor exceeded 150 µg/m^3, which is the federal 24-hour PM10 standard. This plot shows that prevailing directions of winds transporting high PM10 concentrations are primarily from the west and, to a much lesser extent, from the southeast. A second PM10 rose, limited to hours when wind speeds exceeded 5.0 m/sec, is presented in Figure 2-12. This plot suggests that the highest PM10 impacts at the monitor during high wind conditions are generated by sources to the east and east-northeast.

Figure 2-11
Stanfield PM10 Rose of Hours Exceeding 150 µg/m^3

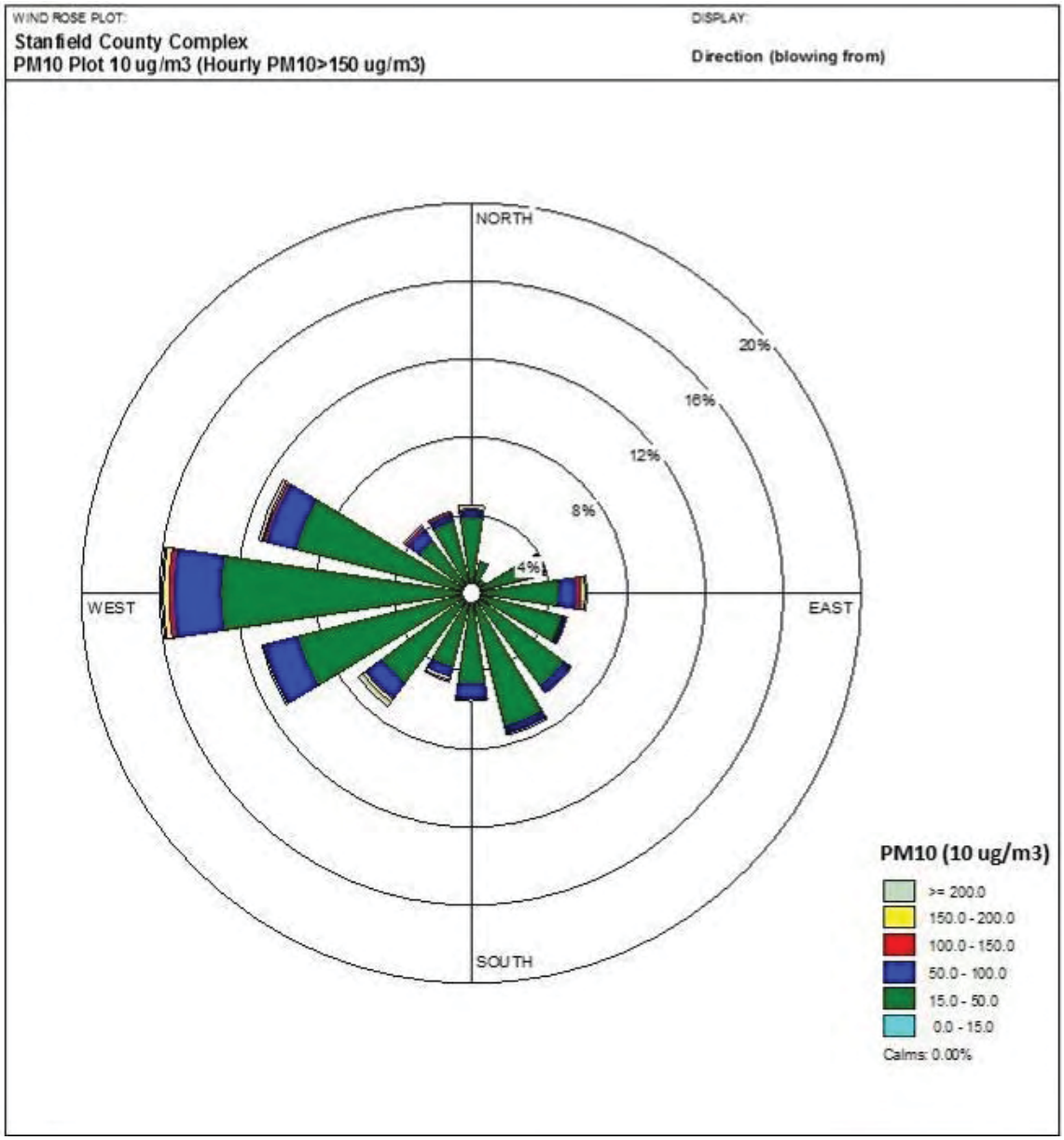
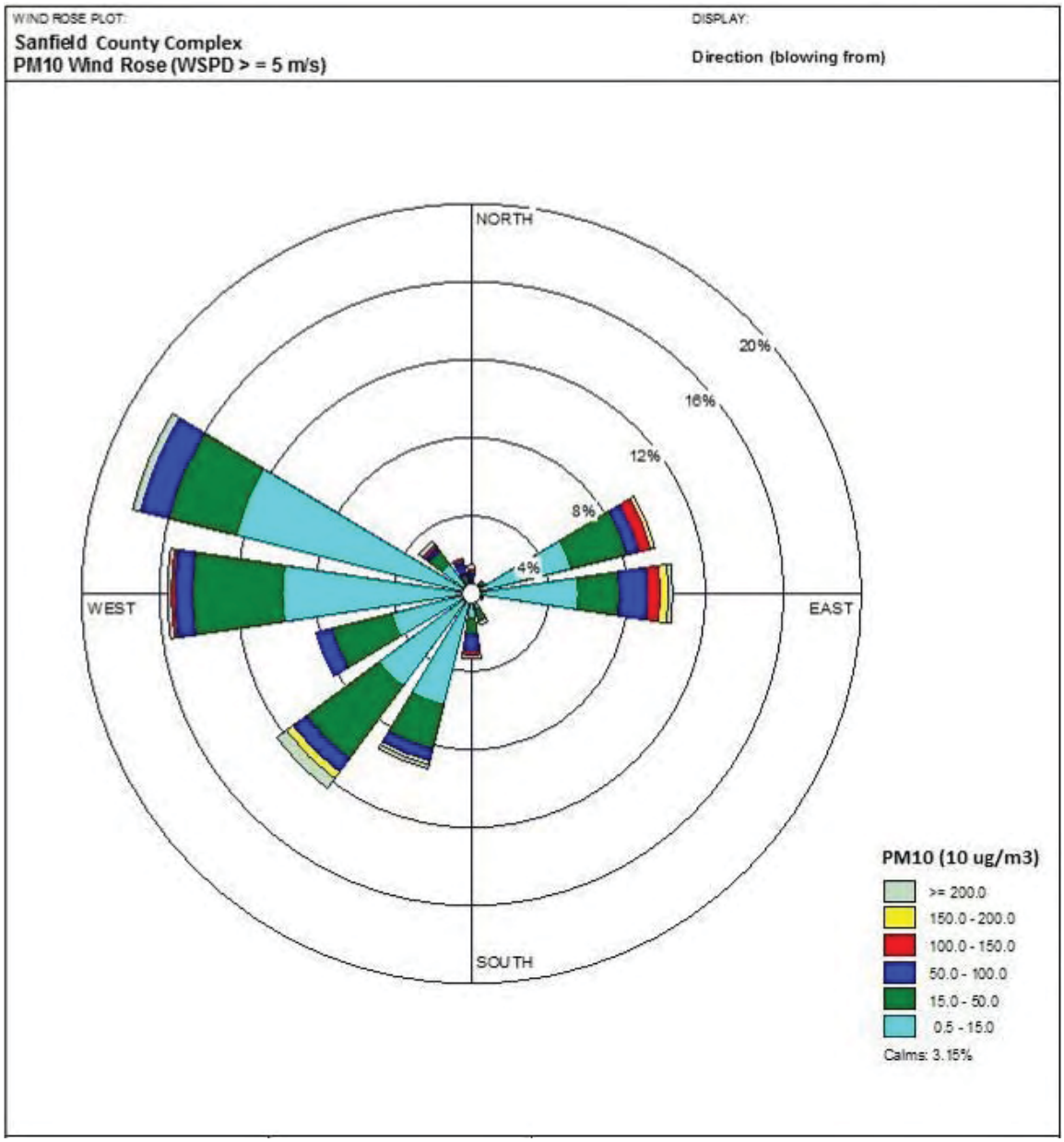


Figure 2-12
Stanfield PM10 Rose of Hours with Wind Speeds > 5.0 m/sec



Two-Variable Analyses – The first two-variable analysis of Stanfield monitoring data sorted hourly PM10 averages by wind speed and wind direction. The table showing this distribution appears in Figure 2-13. High PM10 averages at the highest wind speeds in several directions suggest that episodic windblown dust sources regionally surround the monitoring site. A plot of PM10 hourly counts by wind direction when wind speeds exceed 5.0 m/sec, shown in Figure 2-12 as a PM10 rose, suggest that winds producing high PM10 hour values blow towards the monitor most frequently from the east and east-northeast. Low PM10 averages at low wind speeds in most directions, as shown in Figure 2-13, suggest that few significant PM10 sources are close to the monitor. A review of hourly PM10 maxima by wind speed and azimuth shows that high PM10 concentrations during low wind speeds originate from episodic sources lying in an arc from the south through the northwest of the monitor.

The sums of hourly PM10 concentrations grouped by wind speed and direction are presented in Figure 2-14. This plot suggests that (1) sources within 2.2 miles of the monitor do not significantly contribute to cumulative PM10 concentrations; (2) sources located between 2.2 and 4.5 miles of the monitor and within the arcs of 140-170 degrees and 250-300 degrees produce the highest cumulative impacts at the monitor; and (3) high wind sources in the arcs of 70-90 degrees and 200-240 degrees cumulatively contribute to PM10 measured at the monitor at somewhat higher frequencies or levels than sources lying in other directions. Because the meteorological regimes at Stanfield and Cowtown are somewhat similar, given a separation distance between the two monitors of 8.9 miles over flat terrain, the differences in patterns of PM10 concentrations between the two stations can be attributed almost entirely to the differences in locations, diurnal variabilities, and strengths of the emission sources separately impacting each monitor.

An examination of PM10 averages by hour of day (Figure 2-15) shows that the higher hourly averages of PM10 concentrations occur during the evening hours between 1900 and 2200 hours, with winds from 200 to 330 degrees of the monitor producing higher averages during these hours. Comparison to Figure 2-14 suggests that these higher averages occur more when wind speeds are between 1 and 3 m/sec, suggesting impacts from mechanical sources located within this arc and the possibility of enhancement by the onset of nocturnal inversions. The higher PM10 averages recorded between 0700 and 1000 hours, in comparison with lower averages in hours of 0000 to 0700, suggest that nearby sources related to human activity contribute to daytime background levels at the monitor.

Figure 2-13
Stanfield Hourly PM10 Averages by Wind Speed and Azimuth, All Hours (No Outliers)

Stanfield	Hourly PM10 Average by Wind Azimuth (degrees) and Speed (m/sec), All Data (No Outliers)												
Average of I	Colum												
Row Labe	0	1	2	3	4	5	6	7	8	9	10	12	Count Sub
0	41	70	53	40	107	89	413	1517					303
10	100	67	44	43	46	35	841						278
20	79	50	44	38	67								237
30	24	51	36	47	38	74							188
40	39	51	41	48	48								194
50	41	41	40	34	30	33	28	85					208
60	47	51	41	46	46	37	184	306					235
70	75	54	51	40	107	108	76	528	422	1070			293
80	90	59	51	75	42	123	417	576	973				302
90	20	56	60	61	62	52	85	294	412	1477			378
100	47	57	50	38	23	181	159		122				339
110	51	60	66	94	43	404	237						327
120	45	64	54	40	85	95							371
130	68	55	54	40	236		1020						473
140	73	61	56	62	79	396							568
150	79	62	55	33	59	224							551
160	54	56	57	39	63	737							683
170	69	55	42	72	80	78	424	141					521
180	66	53	41	27	61	258	1002						347
190	102	55	43	34	85	127	322	52		1099			286
200	35	55	37	33	132	90	720	30	111	1683			224
210	85	80	39	39	52	209	151	123	144	539			296
220	177	68	56	34	56	128	318	1077					323
230	82	71	43	40	63	121	355	64		2528			296
240	95	90	69	36	57	68	287	365		467			311
250	103	89	86	38	52	96	197	110					365
260	86	121	97	95	47	76	172	282	218		2098		410
270	81	117	92	45	74	66	126	135	315	842			434
280	53	97	124	90	41	88	123	288		545			427
290	71	85	71	43	77	46	79	151	396	522			494
300	29	92	69	50	47	50	159	575	2497			3384	382
310	100	70	49	44	48	274	89	131	1374				323
320	106	68	45	34	83	105	274						310
330	30	70	48	33	39	233	340	362					322
340	65	63	51	33	71	1060	373						288
350	65	53	46	45	150	120	943						334
Count Subto	185	5583	4309	1294	570	357	202	80	24	15	1	1	12621
Color Scale:	0	50	100	150	200	300	400						

Figure 2-14
Stanfield Sum of Hourly PM10 by Wind Speed and Azimuth, All Hours (No Outliers)

Stanfield Sum of Hourly PM10 Concentrations by Wind Azimuth (degrees) and Speed (m/sec), All Data

Sum of PM Column													
Row La	0	1	2	3	4	5	6	7	8	9	10	12	Grand Total
0	124	6747	8327	1304	645	267	1238	1517					20169
10	300	7621	5508	1194	232	35	1683						16573
20	787	5013	4710	646	201								11357
30	122	4434	2898	520	113	148							8235
40	78	4735	3122	772	337								9044
50	206	3967	3628	238	179	65	28	85					8396
60	141	5217	3522	731	599	183	1103	1223					12718
70	523	6947	4294	850	1499	1844	760	3696	1267	1070			22749
80	720	8613	4145	1726	464	1722	4167	2303	4867				28727
90	59	10164	7103	1772	986	465	851	2056	1236	2954			27646
100	235	10097	6074	938	46	1088	478		122				19077
110	257	10360	7934	1873	214	1212	474						22323
120	179	11498	8444	969	513	190							21793
130	136	13851	10287	998	707		1020						26999
140	511	17679	12611	2402	158	792							34152
150	394	18915	10620	1223	294	897							32341
160	324	20750	13622	1605	1252	4421							41973
170	689	14743	7685	2897	1037	233	1696	141					29120
180	266	9004	5083	655	797	2067	4010						21882
190	407	6591	3856	1159	1694	1652	1287	104		1099			17850
200	248	4773	1838	1337	2635	719	4323	91	222	1683			17869
210	255	8444	2492	2124	1550	3756	1818	492	288	1078			22295
220	530	8813	3722	1476	2089	2694	6050	4307					29681
230	574	8252	2825	1701	2005	2669	3547	64		2528			24163
240	570	13410	4346	1424	1309	1283	1150	2188		467			26146
250	724	16376	8220	1290	1355	1056	1180	221					30422
260	778	21089	11113	4181	1035	1745	2584	1695	218		2098		46536
270	651	18713	10997	2818	2073	2115	2014	406	629	1683			42098
280	265	17961	15010	4326	942	2123	863	3173		1090			45751
290	282	14560	10530	2626	3010	1623	1738	1058	1187	1044			37656
300	117	12105	8429	3077	1281	891	2064	1725	2497			3384	35570
310	401	7476	5221	2763	1247	3016	268	261	1374				22027
320	423	7655	5487	1754	1327	315	822						17783
330	30	7235	6922	1622	541	1629	1019	362					19359
340	326	6767	5743	1285	1495	1060	746						17422
350	456	5894	6757	2253	1952	481	943						18734
Grand Tot	13084	376470	243122	60525	37809	44453	49923	27165	13907	14696	2098	3384	886634
Color Scal	0	4000	8000	12000	16000	20000							

Figure 2-15
Stanfield Hourly PM10 Averages by Azimuth and Hours of the Day, All Hours (No Outliers)

Stanfield — Hourly PM10 Averages by Wind Azimuth (degrees) and Hour of Day, All Data (No Outliers)

Average of I	Colum																							
Row Labe	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	37	11		48	20	14	25	65	64	93	82	52	108	58	34	35	53	42	115	139	136	242	45	53
10	51	32	17	36		31	18	109	73	85	39	101	43	37	57	34	35	44	93	99	104	182	29	57
20	24	37	54	38	27	27	34	56	91	107	43	43	36	34	50	35	31	45	61	82	122	65		75
30		10	10	62	32	12	75	132	54	47	43	41	36	31	30	27	24	34	71	121	88		51	71
40	87	21	89	35	31	49	5	77	127	86	38	37	58	33	34	33	27	35	47	54	65	64		26
50	44	28	19	19	60	20	26	46	21	66	56	40	48	41	33	25	27	34	39	58	77	50	71	45
60	35	76	66	32	38	41	42	137	110	72	70	62	41	35	34	45	32	38	56	55	91	83	124	60
70	58	53	66	58	46	43	47	76	92	103	77	196	47	34	79	47	56	42	64	53	68	99	197	67
80	68	37	62	51	78	32	37	78	80	139	120	135	135	96	60	34	33	45	214	192	237	154	69	72
90	45	43	66	61	28	43	53	86	127	115	96	59	51	164	32	38	54	40	45	83	101	146	60	60
100	54	37	53	30	46	25	71	70	97	73	87	51	50	39	27	30	30	33	68	38	64	39	74	47
110	83	77	52	57	39	41	57	82	105	71	55	41	38	38	26	39	6	135	215	46	88	49	229	88
120	67	37	45	63	37	32	57	81	91	80	47	25	34	34	32	23	22	83	63	122	55	155	70	60
130	64	47	38	33	45	43	54	84	78	65	65	35	29	36	45	73	27	85	27	37	27	118	187	49
140	62	50	57	49	45	41	50	85	88	60	38	29	26	26	29	22	15	71	142	346	269	79	113	75
150	54	50	34	39	50	33	70	94	90	73	49	54	41	36	17	23	11	63	43	79	122	140	75	48
160	41	43	42	30	38	43	63	75	85	71	37	38	38	32	42	38	2068	39	59	414	96	59	69	70
170	61	45	40	27	33	40	61	69	80	62	71	67	28	26	19	81	40	21	37	151	148	80	82	54
180	36	86	29	36	28	30	42	69	75	79	31	111	36	79	69	22	36	67	63	31	69	82	62	164
190	57	35	44	39	20	36	40	81	99	65	30	49	96	19	266	68	28		201	126	95	61	71	49
200	22	46	19	27	39	42	34	36	112	174	329	176	56	52	52	61	32	18	42	69	463	76	47	41
210	75	47	25	38	62	27	43	39	81	79	44	51	37	100	29	156	158	74	143	90	185	71	58	130
220	35	63	23	46	53	38	53	61	74	46	52	43	118	51	167	202	93	121	70	78	322	110	85	58
230	62	40	33	45	28	25	35	97	119	63	34	29	209	64	85	47	42	39	135	47	100	199	91	92
240	35	26	55	40	41	42	61	71	35	39	39	58	28	148	71	82	93	111	39	138	191	133	98	53
250	47	27	32	58	48	45	25	67	41	46	68	45	59	29	34	84	35	60	46	163	202	110	81	66
260	41	54	39	39	44	36	29	42	98	88	156	137	79	45	78	80	46	250	93	167	240	189	133	66
270	58	69	67	58	50	44	46	77	91	70	39	42	116	117	100	36	94	35	61	155	209	153	129	59
280	50	54	63	40	56	69	60	71	88	65	50	61	52	35	43	49	89	58	123	201	228	236	94	84
290	84	63	48	39	34	27	30	51	80	46	77	38	88	32	53	38	74	64	55	147	142	121	145	75
300	64	41	42	47	12	28	68	53	99	62	109	196	40	41	39	76	58	38	104	201	143	241	64	69
310	55	38	41	54	29	53	27	104	30	87	56	64	44	57	36	32	109	82	70	86	115	90	63	52
320	48	66	42	31	18	34	45	59	90	38	38	48	41	86	34	36	34	52	43	99	197	64	109	36
330	66	45	32	28	35	39	43	40	55	147	44	42	35	31	37	60	39	38	81	96	103	136	72	27
340	32	59	60	48	80	25	15	15	36	71	142	40	38	65	52	34	35	52	65	105	117	120	84	74
350	68	36	32	30	39	15	18	25	138	52	43	35	36	41	40	66	35	52	65	86	83	356	81	15

Color Scale:	0	50	100	150	200

Summary – A cluster of sources lying within 4.5 miles to the south through northwest of the monitor appears to produce the highest impacts at the monitor during low wind conditions. No sources within 2.2 miles of the monitor appear to produce high impacts. Windblown dust sources producing the highest impacts at the monitor appear to lie to the east and east-northeast of the monitor. Mechanical source activity occurring in the late evening should be investigated to determine the sources of high PM10 impacts during these hours.

Inventory Focus – Mechanical sources lying within 4.5 miles and 200 to 330 degrees of the monitor should be identified through field inspection and interviews of people living or working near the monitoring station. Activity rates and emission characteristics of these sources should be estimated from available records or field observation. Land uses and soil characteristics lying along the back-trajectories of high wind hours on the selected high wind design day should be identified from record data or evaluated from sample collection and analysis.

2.3 Casa Grande

The hourly PM10 data were collected at an urban site within the city of Casa Grande, while the meteorological data were collected at the city's airport, approximately 4 miles to the north. For this analysis, we assumed that the wind patterns at the downtown site were very similar to those recorded at the airport. Because of this separation distance, however, the relative locations of some sources, especially those close to the monitor producing impacts during low wind "meander" conditions, cannot be estimated with the same accuracy as those near other monitors where meteorological monitors are co-located with PM10 instruments.

Single-Variable Analyses – A table of hourly PM10 averages and maxima grouped by wind speed is shown in Table 2-3. This table suggests that there are no significant sources operating in a continuous fashion within a few kilometers of the monitor. An elevated maxima PM10 hour when wind speeds are between 3 and 4 m/sec, however, suggests that an occasional episodic emission event may occur within the urbanized area of Casa Grande. Higher hourly PM10 averages and maxima at wind speeds above 9 m/sec indicate that this monitor is impacted by windblown dust sources within the surrounding region.

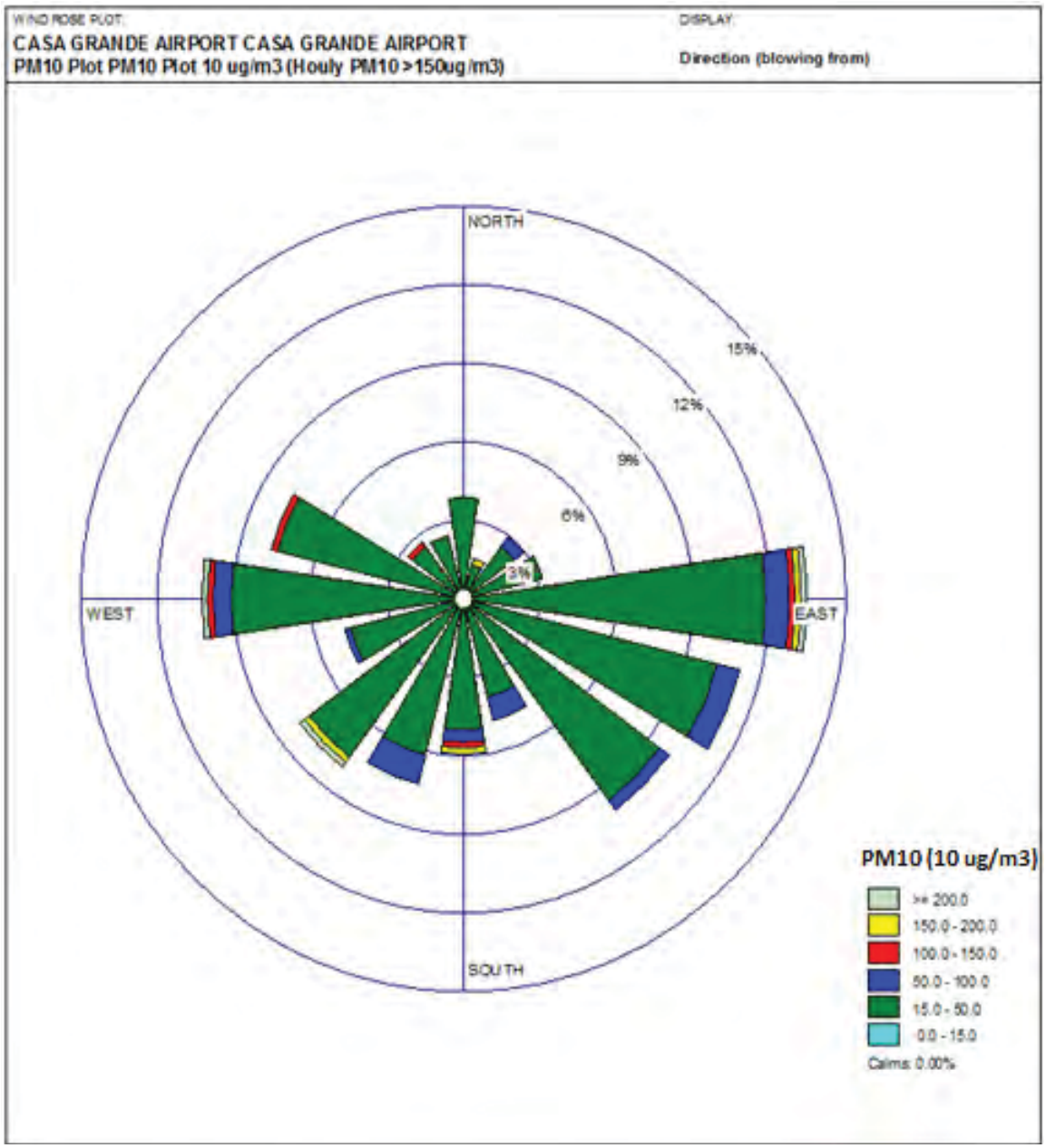
Confirmation of the absence of significant sources, and the presence of episodic emission events, in the urbanized area is shown in Table 2-4. This table represents hourly PM10 averages and maxima for all hours during which hourly PM10 concentrations at the monitor exceeded 150 $\mu g/m^3$. The relatively low numbers of hours shown in the Observation Count column for wind speeds less than 5 m/sec suggests that high PM10 hours at the monitor at low and moderate wind speeds are relatively infrequent and that local and nearby sources are not continuously significant in emission strength, but rather may be significant on an episodic basis.

Table 2-3 Casa Grande Hourly Average and Maximum PM10, All Hours (No Outliers)			
Wind Speed Category (m/s)	Observation Count	Average PM10	Max PM10
0~1	1,771	52	417
1~2	5,101	48	400
2~3	3,419	42	561
3~4	2,109	42	2,172
4~5	1,309	44	757
5~6	736	57	1,972
6~7	458	73	1,698
7~8	254	76	693
8~9	151	101	902
9~10	85	202	3,565
10~11	44	290	1,603
11~12	11	562	4,173
12~13	6	463	1,453
13~14	1	38	38
Total Count	15,455	N/A	N/A

Table 2-4 Casa Grande Hourly Average and Maximum PM10, Hours > 150 µg/m^3 (No Outliers)			
Wind Speed Category (m/s)	Observation Count	Average PM10	Max PM10
0~1	43	188	417
1~2	96	196	400
2~3	47	206	561
3~4	34	316	2,172
4~5	32	233	757
5~6	36	327	1,972
6~7	27	470	1,698
7~8	27	275	693
8~9	27	275	902
9~10	30	444	3,565
10~11	29	409	1,603
11~12	8	760	4,173
12~13	5	527	1,453
Total Count	442	N/A	N/A

The count of PM10 hours during which concentrations at the Casa Grande monitor exceed 150 µg/m^3 is presented in a PM10-rose format in Figure 2-16. This figure shows that during hours of elevated PM10, winds typically blow from the east through southeast and the west through west-northwest quadrants.

Figure 2-16
Casa Grande PM10 Rose of Hours Exceeding 150 µg/m^3
(No Outliers)



Two-Variable Analyses – The distribution of hourly PM10 averages by wind direction and wind speed at the Casa Grande monitor is shown in Figure 2-17. Relatively uniform and low PM10 averages at wind speeds of less than 5 m/sec suggest the absence of continuously significant sources within a few miles of the monitor. Scattered high PM10 averages at wind speeds above 7 m/sec suggest variability in emissions rates from windblown dust sources in the region surrounding the urbanized portion of Casa Grande. This variability could be due to emission seasonality resulting from high wind seasonality driven by monsoon conditions.

Emission variability is also borne out by the distribution of hourly PM10 maxima by wind direction and speed, as presented in Figure 2-18. Scattered hot spots in this figure suggest the episodic nature of PM10 emissions from sources impacting the monitor. This pattern suggests that controls implemented to bring the Cowtown and Stanfield monitors into attainment will probably reduce high episodic emission rates in the area surrounding the Casa Grande monitor and obviate the need to conduct inventory research focused on sources near this monitor.

The sum of hourly PM10 distributed by wind direction and wind speed is displayed in Figure 2-19. This plot shows that emission sources lying in an arc between 60 and 140 degrees and within 6.7 miles of the monitor are responsible for the highest cumulative impacts at the monitor.

Summary – No significant sources within the urbanized portion of Casa Grande were found to impact the monitor. Periodic high impacts from surrounding rural areas suggest the generation of significant emissions during high events entraining dust from disturbed lands.

Inventory Focus – As the Casa Grande monitoring site was not selected for a design day attainment demonstration, no modeling domains that included this site were developed, and no focused emission inventory will be researched and compiled at this site. Although the Maricopa monitoring site was selected for an attainment demonstration, no meteorological data have been collected at this site and, as a result, this site was not included in initial study analyses.

Figure 2-17
Casa Grande Hourly PM10 Averages by Wind Azimuth (degrees) and Wind Speed (m/sec)

Casa Grande	Hourly PM10 Average by Wind Azimuth (degrees) and Speed (m/sec), All Data													
Average Colun														
Row L	0	1	2	3	4	5	6	7	8	9	10	11	12	13
0	58	61	43	38	48	19	48							
10	71	42	40	40	33	55	27	537		48				
20	51	53	49	44	27	41	11	29						
30	45	49	49	34	25	65	23	27	40					
40	32	48	42	34	24	22	41	23	34	17				
50	55	54	50	36	40	31	116	380	76	47				
60	63	56	49	31	37	22	74	68	20	78	25			
70	46	49	44	46	35	34	45	39	83	68	40	28		
80	68	51	38	34	40	37	47	142	58	292	1603			
90	57	53	44	44	40	49	37	46	82	163	452	422		
100	35	53	48	37	46	50	47	100	62	66	212		21	
110	92	57	51	48	47	49	64	206	247	547	849			
120	51	58	55	42	68	41	35	57	126		64			
130	39	59	58	51	37	175	23	98	156					
140	46	57	58	47	43	69	64	273						
150	46	54	51	47	35	42	113	294						
160	49	52	47	47	24	117	92	92	302	151				
170	50	52	48	41	44	77	58	33	28		533			
180	33	54	43	43	51	41	307	42	340					
190	49	51	47	35	23	45	100	88	395	281	152		56	
200	44	46	42	37	41	41	56	43	42	67	228	594		
210	68	52	39	40	32	71	84	82	109	407	287			
220	67	52	41	36	80	63	244	138	68	37				
230	40	42	39	47	64	69	97	124						
240	39	41	45	40	38	80	98	67	131					
250	44	46	38	38	47	85	51	81	103	105				
260	35	47	41	48	43	49	43	67	52	84	71	126		301
270	207	38	41	42	42	51	57	111	67	128	116	313	142	420
280	95	47	36	42	51	42	57	52	81	74	112	215	1247	38
290	44	40	37	41	47	47	46	55	83	66	95	103	673	
300	33	41	40	35	39	39	43	49	77	85	277	264		
310	89	50	37	35	32	56	36	60	116	71	252	687		
320	74	54	38	35	36	48	50	37	38		191			
330	59	48	31	34	38	22	96	30	36	158				
340	52	48	38	34	34	28	44	19			56	263		
350	34	50	37	38	42	27	29	45	255	118	242			
360	21	47	43	42	41	17	29		178	171	105			
Color Sca	0	50	100	150	200	250	300							

Figure 2-18
Casa Grande Hourly PM10 Maxima by Wind Azimuth (degrees) and Wind Speed (m/sec)

Casa Grande	Hourly PM10 Maxima by Wind Azimuth (degrees) and Speed (m/sec), All Data														
Max of P Colun															
Row L	0	1	2	3	4	5	6	7	8	9	10	11	12	13	(blank)
0	67	236	170	147	161	28	120								
10	182	180	154	109	62	276	27	1556		48					
20	75	173	156	111	41	109	12	29							
30	45	208	197	94	45	109	34	42	40						
40	62	261	124	97	73	44	67	27	34	17					
50	81	292	178	153	170	87	583	693	103	47					
60	133	230	167	95	187	44	120	87	20	124	25				
70	61	203	159	163	138	118	99	68	83	74	40	28			
80	217	165	196	105	99	96	121	635	129	292	1603				
90	122	188	152	515	159	161	93	112	348	384	3565	704			
100	90	157	166	120	328	152	209	750	153	142	330		21		
110	158	384	377	561	339	236	199	411	247	547	849				
120	119	263	382	164	486	100	67	61	200		64				
130	55	400	223	234	137	892	31	98	287						
140	102	244	329	195	308	205	152	550							
150	73	246	513	179	108	122	343	548							
160	81	176	183	139	43	757	310	148	721	187					
170	114	164	248	186	125	281	98	60	44		533				
180	65	235	236	267	148	84	1972	119	340						
190	126	203	322	88	93	242	1461	409	902	281	152		56		
200	133	143	286	148	266	120	385	106	192	140	284	954			
210	118	170	120	339	89	934	262	240	281	801	552				
220	167	376	176	259	2172	312	1698	205	68	37					
230	64	192	176	331	325	283	284	166							
240	43	204	291	199	124	204	167	159	259						
250	116	152	172	200	174	251	166	107	185	146					
260	92	264	197	847	136	103	92	196	56	84	71	126		301	
270	207	121	164	150	344	512	326	1031	175	335	239	733	142	420	
280	145	137	203	215	264	168	700	152	241	175	291	301	4173	38	
290	123	146	116	178	323	185	127	203	220	123	143	186	1453		
300	44	157	210	183	135	169	112	130	180	152	277	449			
310	157	141	122	132	91	285	64	89	116	73	272	1140			
320	117	202	148	135	139	187	130	37	38		191				
330	70	207	108	164	131	46	226	53	36	179					
340	99	417	142	112	131	59	56	19			56	263			
350	61	241	122	116	151	58	34	70	397	118	242				
360	39	138	164	132	109	31	43		259	182	105				
(blank)															
Color Sca	0	200	400	600	800										

Figure 2-19
Casa Grande Sum of PM10 by Wind Azimuth (degrees) and Wind Speed (m/sec), All Hours (No Outliers)

Casa Grande	Sum of Hourly PM10 by Wind Azimuth (degrees) and Wind Speed (m/sec)														
Sum of PM Columr															
Row Lal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	Grand Tota
0	115	2581	2212	2071	1348	116	193								8636
10	284	3182	2963	2091	685	549	27	1612		48					11443
20	303	4183	2931	1051	216	204	21	29							8939
30	45	4406	2989	615	150	196	69	82	40						8590
40	192	4515	2650	509	341	223	82	46	34	17					8608
50	218	7608	3002	572	802	307	926	761	153	47					14394
60	252	9387	3884	645	675	130	444	137	20	156	25				15754
70	185	9146	4931	1459	700	372	627	117	83	137	40	28			17826
80	613	9811	5527	1545	1555	1227	793	1418	174	292	1603				24556
90	687	12353	8850	2929	2748	2639	1850	1904	3831	3106	7235	1687			49817
100	176	12968	14015	2610	2381	1643	1083	1296	868	856	1061		21		38979
110	461	13683	15045	4344	932	728	514	617	247	547	849				37969
120	717	10920	12783	4088	2248	497	69	114	253		64				31752
130	195	7798	12582	4850	1205	1403	68	98	312						28509
140	229	8441	9839	3717	904	625	192	819							24765
150	138	5756	6737	2270	451	250	563	588							16754
160	438	5165	4654	1424	291	1055	462	184	907	302					14881
170	198	5635	4593	1452	614	919	231	99	55		533				14328
180	134	5865	4465	2065	1019	493	2457	167	340						17003
190	388	6005	5454	1356	551	675	2507	791	1581	281	152		56		19796
200	309	5790	4763	2210	1738	1176	1340	639	466	269	456	1188			20344
210	408	6406	5204	3285	1938	3314	2521	1639	1307	814	575				27410
220	606	7910	7048	2486	4620	2384	4395	691	68	37					30243
230	359	5156	5082	3041	2869	1652	773	495							19427
240	77	5548	5361	2590	1531	1202	294	734	523						17860
250	266	4774	4597	2928	1545	1105	560	243	517	210					16744
260	176	4555	5065	5500	2637	1481	894	535	313	84	71	126		301	21738
270	207	2829	4815	5589	5410	3058	2577	2101	1473	1156	696	1251	142	420	31724
280	285	2333	3590	6667	8609	5048	4808	2387	2023	1327	1121	858	4987	38	44078
290	218	1660	3180	5041	8429	7558	3284	2825	1571	461	851	206	2019		37303
300	201	2371	3157	3370	4042	3043	1899	976	692	510	277	792			21328
310	178	2379	2513	2751	1396	1841	287	480	116	141	503	1374			13961
320	221	2483	3792	3114	1860	913	351	37	38		191				13000
330	235	2761	2715	3169	1604	200	288	91	36	475					11574
340	156	3045	4182	3616	1488	389	133	19			56	263			13347
350	68	3131	3465	5881	2319	384	117	90	1020	118	242				16834
360	62	1075	2052	2794	1424	100	115		356	342	105				8424
Grand Tot	10001	213612	200684	105692	73271	49097	37813	24860	19416	11732	16704	7773	7225	758	778638
Color Scal	0	2500	5000	7500	10000										

2.4 Pinal County Housing

Single-Variable Analyses – An analysis of PM10 impacts grouped by wind speed is presented in Table 2-5. The low averages for wind speeds less than 5 m/sec indicate the absence of continuously significant mechanical sources within a few miles of the monitor. The moderately high maximum hourly PM10 values, up to 5,000 µg/m^3, at wind speeds of 0 to 2 m/sec suggest, however, the presence of significant episodic sources near to the monitor that periodically contribute to elevated 24-hour average PM10 concentrations.

Table 2-5
Pinal County Housing Average and Maximum PM10, All Hours
(No Outliers)

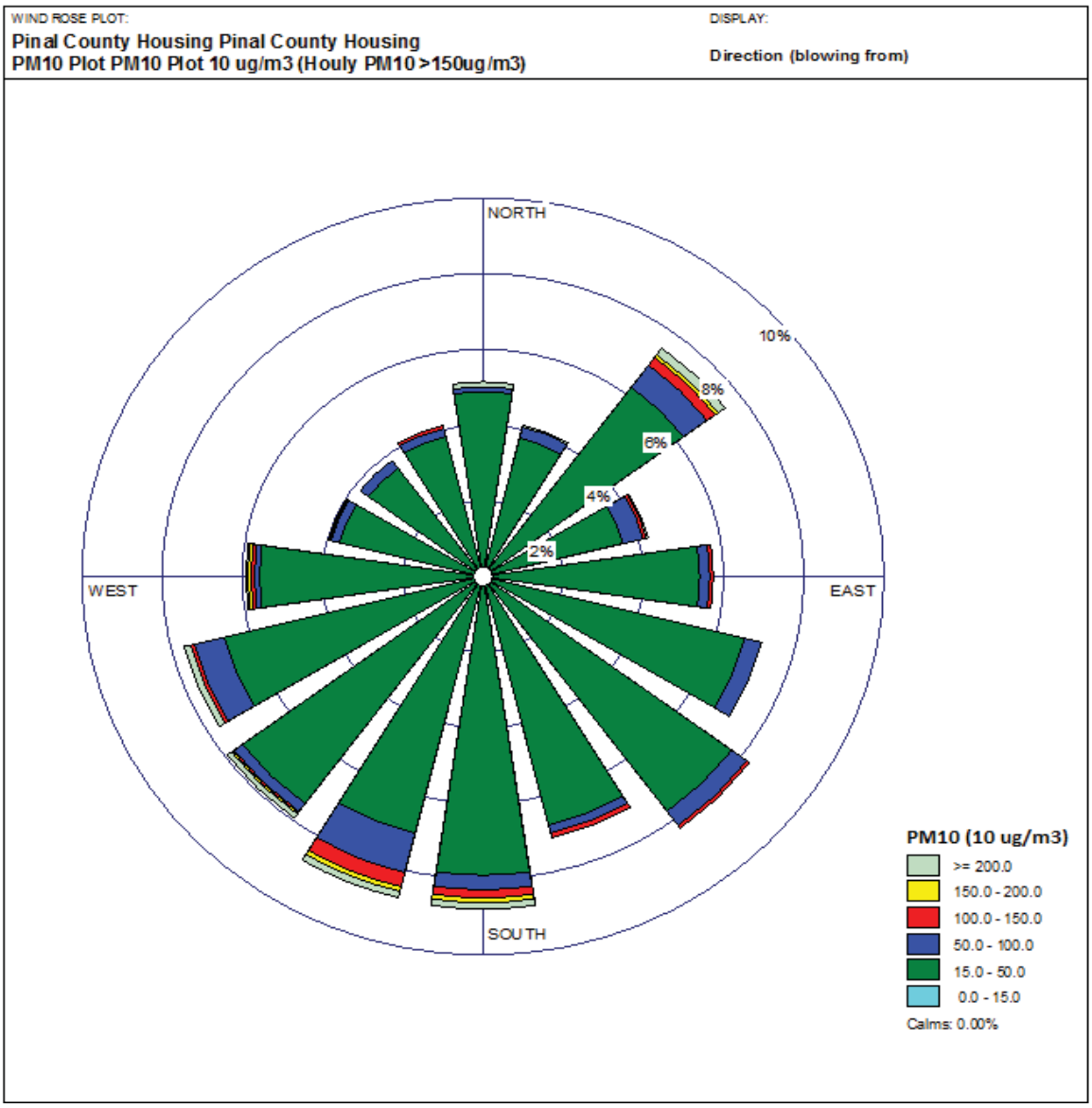
Wind Speed Category (m/s)	Observation Count	Average PM10	Max PM10
0~1	10808	74	2292
1~2	8564	56	5004
2~3	3486	47	937
3~4	1593	63	2914
4~5	869	105	8608
5~6	481	213	5591
6~7	212	408	8449
7~8	81	475	2311
8~9	24	954	5774
9~10	8	1098	4281
10~11	4	1302	3141
Total Count	26130	N/A	N/A

The relationships of hourly PM10 impacts and wind speeds were further studied by limiting the above analysis to those hours during which the monitor recorded hourly PM10 concentrations greater than 150 µg/m^3. The results of this analysis are shown in Table 2-6. The relationship between increasing wind speed and increasing fraction of hours when PM10 is greater than 150 µg/m^3 suggests that soils in the region of Pinal County Housing are frequently disturbed and available to contribute entrained PM10 emissions during high wind events. The higher fraction of elevated PM10 hours when wind speeds are less than 1 m/sec, compared to hourly fractions when wind speeds are between 1 and 4 m/sec, suggests the presence of PM10 sources close to the monitor that produce impacts when wind meander and limited dispersion occur at these low wind speeds.

Table 2-6 Pinal County Housing Average and Maximum PM10, Hours Exceeding 150 µg/m^3 (No Outliers)			
Wind Speed Category (m/s)	Observation Count (Hours > 150 µg/m^3)	Fraction of Total Hours	Average PM10 (Hours > 150 µg/m^3)
0~1	1202	51%	241
1~2	475	20%	240
2~3	104	4%	259
3~4	103	4%	351
4~5	119	5%	446
5~6	152	7%	541
6~7	106	5%	748
7~8	52	2%	707
8~9	15	1%	1498
9~10	6	<1%	1442
10~11	3	<1%	1736
Total Count	2337	100%	N/A

A PM10 rose based on hours when PM10 concentrations exceed 150 µg/m^3 is presented in Figure 2-20. This rose shows that sources producing hourly PM10 concentrations above 150 µg/m^3 appear to surround the monitor. Sources producing the highest hourly concentrations appear to lie to the northeast, south, and south-southwest of the monitor.

Figure 2-20
Pinal County Housing PM10 Rose of Hours Exceeding 150 µg/m^3
(No Outliers)



Two-Variable Analyses – Hourly PM10 averages grouped by wind speed (m/sec) and direction (degrees) at Pinal County Housing are displayed in Figure 2-21. Uniform and moderate hourly PM10 averages at wind speeds less than 5 m/sec suggest that continuously emitting sources surround the monitor. These sources appear to produce an elevated background concentration of PM10 at the monitor, but not at levels that exceed the 24-hour standard. The uniformity of hourly averages within this range of wind speeds and in all directions also suggests the presence of mechanical dust sources of uniform emission strength. High hourly PM10 averages at wind speeds greater than 6 m/sec in many directions also suggests that disturbed soil surfaces surround the monitor, with sources centered on 50, 200, and 250 degrees from the monitor producing the highest impacts primarily because of the prevailing directions of highest wind speeds.

A corresponding table of hourly PM10 maxima by wind speed (m/sec) and direction (degrees) is presented in Figure 2-22. The occasional elevated PM10 maxima at wind speeds of less 6 m/sec indicate that sources relatively close and within arcs spanning 0 to 80 degrees and 180 to 270 degrees of the monitor periodically generate high levels of emissions.

The combinations of wind speeds and wind directions responsible for the greatest cumulative PM10 impacts are shown in Figure 2-23, which presents the sums of hourly PM10 concentrations grouped by wind speeds and directions. The highest cumulative subtotals at wind speeds of 1 to 2 m/sec suggest that sources within 4.5 miles, and in almost all directions, of the monitor are responsible for a majority of PM10 measured. At these wind speeds, mechanical generation will be the primary mechanism for emission generation.

Figure 2-21
Pinal County Housing Hourly PM10 Averages by Wind Azimuth (degrees) and Wind Speed (m/sec), All Data (No Outliers)

Pinal County Housing	Hourly PM10 Averages by Wind Azimuth (degrees) and Speed (m/sec), All Data (No Outliers)												
Average	**Colum**												
Row L	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Average**
0	108	65	45	60	29	77							77
10	76	62	51	60	182	71	1002						77
20	81	61	61	54	60	92	2065	57					78
30	65	58	51	103	72	115	348	300					69
40	77	54	50	50	80	215	406	1839					83
50	61	57	53	61	60	280	187	780	1016	919			106
60	68	69	60	56	55	71	288	223	302				79
70	73	55	46	55	137	168	179	464					69
80	72	61	47	56	250	1237	406						87
90	82	71	60	87	25	156	95						74
100	84	69	47	75	213	140		8449					88
110	86	71	60	70	198	304	250						76
120	75	73	48	58	267	64							73
130	72	72	45	49	42	112							67
140	73	64	45	77	81	167	108	410	90				65
150	65	61	48	43	78	184	413	655					62
160	76	64	46	41	87	392	257				108		63
170	79	60	55	36	81	48	176	100					61
180	73	66	56	44	79	47	218	727	744	800			80
190	80	74	54	74	70	116	194	235	239	510			82
200	87	69	55	53	55	77	213	281	320	1484	2235		91
210	68	71	53	48	62	84	208	495	525	413		370	84
220	84	67	49	48	62	99	364	122					73
230	84	74	48	53	61	59	496	409					71
240	73	68	49	56	53	290	174	1040	118				76
250	96	70	45	47	78	107	161	721	2198	661	570		79
260	95	66	41	47	66	102	277	576	234	5774			74
270	99	61	43	53	84	152	265	264					67
280	87	59	44	46	62	121	318	690					61
290	72	64	40	48	224	86	653	700					63
300	93	59	44	59	118	41							60
310	78	53	39	48	45	157							55
320	91	56	37	36	75	358							58
330	84	59	82	42	170	197	412						71
340	78	70	58	33	125	182							68
350	73	61	41	40	96	169							60
360	73	60	58	39	74	137							63
Average	**79**	**65**	**49**	**52**	**77**	**144**	**278**	**521**	**631**	**1229**	**1287**	**370**	**72**
Color Scale:		0	50	100	150	200	300	400					

Figure 2-22
Pinal County Housing Hourly PM10 Maxima by Wind Azimuth (degrees) and Wind Speed (m/sec), All Data (No Outliers)

Pinal County Housing	Hourly PM10 Maxima by Wind Azimuth (degrees) and Speed (m/sec), All Data (No Outliers)												
Max of P Colum													
Row L	0	1	2	3	4	5	6	7	8	9	10	11	Max
0	2052	554	237	344	69	146							2052
10	578	355	374	376	2234	359	3619						3619
20	633	455	417	171	444	219	5591	82					5591
30	498	697	379	2914	425	432	696	300					2914
40	976	463	224	357	597	1208	2922	1839					2922
50	369	450	288	235	321	2518	479	3731	2316	919			3731
60	588	505	1444	296	322	381	3883	1285	460				3883
70	503	336	301	198	543	730	382	622					730
80	490	431	180	184	1279	8608	1069						8608
90	454	531	371	636	42	217	95						636
100	522	442	188	511	629	259		8449					8449
110	565	667	837	192	449	558	250						837
120	395	622	168	410	1421	92							1421
130	436	540	159	203	248	396							540
140	387	557	583	1074	386	869	187	443	90				1074
150	310	441	524	417	711	850	1467	655					1467
160	457	386	376	255	617	1436	363				108		1436
170	341	568	422	163	1269	443	1402	190					1402
180	290	400	400	320	997	349	2265	3771	1880	800			3771
190	389	1049	379	2193	437	1134	2471	997	964	856			2471
200	587	721	670	317	552	765	2806	1439	814	4281	3141		4281
210	308	475	658	322	251	412	1108	2400	1579	826		740	2400
220	562	320	444	192	444	457	2033	250					2033
230	490	490	191	323	223	120	1737	781					1737
240	298	478	706	1139	216	3714	541	2311	118				3714
250	790	626	261	288	1104	722	732	3555	3875	661	570		3875
260	474	526	408	169	328	538	1589	718	252	5774			5774
270	2292	433	277	314	776	808	1088	264					2292
280	478	294	343	151	310	403	457	1568					1568
290	620	675	292	142	1289	86	2863	700					2863
300	648	421	619	506	215	41							648
310	435	949	313	163	104	296							949
320	484	341	133	118	127	498							498
330	613	549	5004	209	352	487	412						5004
340	457	1133	937	172	265	182							1133
350	452	1145	252	135	169	203							1145
360	319	479	372	187	206	202							479
Max	**2292**	**1145**	**5004**	**2914**	**2234**	**8608**	**5591**	**8449**	**3875**	**5774**	**3141**	**740**	**8608**
Color Scale:		0	100	200	400	800	1000	1500	2000				

Figure 2-23
Pinal County Housing Sum of Hourly PM10 by Wind Azimuth (degrees) and Wind Speed (m/sec), All Data
(No Outliers)

Pinal County Housing			Sum of Hourly Average PM10 by Wind Azimuth (degrees) and Speed (m/sec), All Data										
Sum of PI Colum													
Row La	0	1	2	3	4	5	6	7	8	9	10	11	Sum
0	11853	7454	2113	1324	116	385							23245
10	11996	12886	4791	1750	4188	498	4006						40114
20	8964	11448	5741	2381	1797	1008	6195	114					37647
30	7647	11314	6312	6208	2367	2177	1739	300					38064
40	10431	10321	5752	4116	3857	7542	8518	1839					52376
50	6739	11466	4754	2078	2693	12037	5801	7802	6094	919			60384
60	8285	15428	3963	2031	1430	2066	5751	2895	603				42452
70	10225	11967	3024	1315	2459	1179	1076	1857					33102
80	11205	13933	3120	1070	2002	9893	1217						42439
90	12781	20054	3083	1040	76	312	95						37441
100	14204	23042	2503	1346	1276	700		8449					51520
110	17234	28992	3947	1048	988	609	250						53069
120	19553	39826	3867	1339	2402	128							67115
130	19455	40666	6283	1435	883	670							69392
140	14088	35070	7247	2678	2267	1499	216	820	90				63975
150	11192	31643	10415	2631	2956	1104	2480	655					63075
160	14686	31841	14009	4917	3137	3924	771				108		73393
170	13466	28077	16701	4498	3624	1104	2819	200					70488
180	9653	22096	12614	3995	4169	932	4584	7265	5209	800			71316
190	10005	22903	10572	8034	3877	3833	5614	3989	1194	2040			72060
200	9106	17006	9479	6983	5702	4993	8962	5900	2241	7419	4469		82260
210	9040	20432	11316	4326	5321	4791	6446	8905	5777	826		740	77920
220	10615	21524	9644	4429	4602	4929	7998	611					64353
230	9317	21636	9037	5517	1880	892	3473	1638					53389
240	7996	17191	10755	6582	2472	5800	2614	6242	118				59770
250	9613	15910	11680	8193	7161	4267	3210	5045	6593	661	570		72902
260	7490	15436	9878	7497	5804	4194	5822	1727	467	5774			64088
270	9105	14833	10070	5928	4044	4110	2918	264					51271
280	7739	15803	10367	3894	1799	1692	955	2071					44319
290	7483	16923	9145	1967	1795	86	3265	700					41363
300	9353	18480	7907	1818	355	41							37954
310	9650	14583	5842	869	136	315							31394
320	10170	15702	5577	1229	226	716							33620
330	8702	16278	10748	1093	681	590	412						38502
340	7672	16886	6731	756	627	182							32854
350	8698	14902	3292	889	383	338							28501
360	4642	5997	2211	815	517	410							14591
Sum	**390051**	**709945**	**274486**	**118017**	**90068**	**89946**	**97205**	**69284**	**28388**	**18439**	**5147**	**740**	**1891716**
Color Scale:		0	5000	10000	15000	20000							

Diurnal variations in PM10 impacts were analyzed by grouping hourly PM10 concentrations by hour of the day and wind speed or wind direction. The table showing hourly PM10 averages by wind direction and hour of the day is presented in Figure 2-24. Increasing hourly PM10 averages between 0700 and 1000 hours suggest that mechanical activities produce higher emissions from sources near the monitor than occur between 0100 and 0700 hours. Decreasing hourly PM10 averages between 1000 and 1500 hours, compared with averages between 0700 and 1000 hours, suggest either lower emission rates or, more probably, increasing mixing height overcoming higher morning emissions. Scattered elevated PM10 averages between 1600 and 2100 hours suggest episodic source impacts, possibly resulting from high wind events.

Figure 2-25 shows the hourly PM10 averages by wind speed and hour of the day. The cluster of highest averages between 0900 and 2300 hours and between 6 and 11 m/sec wind speeds suggests that high wind events produce the highest consistent concentrations at the monitor, and that high wind events tend to occur during these hours and not during nocturnal hours after 2300 hours.

Figure 2-25 also shows the increase in PM10 averages from 0700 to 1000 hours at all wind speeds, possibly due to increases in mechanical source emissions near the monitor. Correspondingly, averages are seen to rise between 1900 and 2200 hours, especially at very low wind speeds, but these increases occur after the evening traffic peak. Looking back at Figure 2-24, evening increases in PM10 appear when winds are blowing from some, but not all, directions toward the monitor. Emission investigations at this site should include an assessment of mechanical activities occurring during these hours of the day within one or two miles and within the arc of 60 to 200 degrees of the monitor.

Finally, fairly low PM10 averages are seen at wind speeds between 6 and 8 m/sec during the nocturnal hours of 0400 to 0800. The lack of windblown dust at these wind speeds and during these hours suggests the presence of a mitigation factor unique to this time period. The source of this mitigating influence should also be included in emission investigations at this site.

Figure 2-24
Pinal County Housing Hourly PM10 Averages by Wind Azimuth (degrees) and Hour of Day, All Data (No Outliers)

Pinal County Housing Hourly PM10 Averages by Wind Azimuth (degrees) and Hour of Day, All Data (No Outliers)

Averag Colu / Row	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Averag
0	43	24	70	37	37	47	71	89	130	116	97	60	37	38	37	51	22	71	174	98	110	79	88	40	77
10	55	36	27	43	31	49	65	97	123	121	66	52	57	41	27	27	40	63	55	124	135	101	160	262	77
20	42	41	55	40	34	32	52	79	112	105	86	57	55	41	69	34	35	36	266	116	147	62	41	58	78
30	47	50	34	33	35	39	56	72	128	87	59	65	95	84	45	217	65	53	48	103	78	82	38	83	69
40	46	40	43	52	28	34	44	86	104	127	260	199	94	85	170	105	63	61	118	71	90	68	62	54	83
50	47	42	39	35	34	42	38	74	75	81	165	224	315	146	179	76	81	113	299	97	117	84	78	50	106
60	96	64	40	35	44	37	39	90	110	81	54	74	57	53	23	32	55	416	100	160	159	83	58	28	79
70	59	66	45	50	40	39	51	72	98	63	88	96	43	42	59	58	19	24	80	146	97	77	109	87	69
80	58	56	99	47	44	38	58	77	70	45	36	47	53	31	24	37	34	857	222	106	115	128	85	48	87
90	72	80	69	36	34	44	36	75	91	113	52	27	16	31	29		38	55	132	158	123	140	80	59	74
100	285	48	48	50	47	38	54	81	81	110	39	63	16	15	4	35	42	69	136	161	139	105	66	74	88
110	79	56	53	43	51	43	49	96	102	47	55	62	49	31	11	10	119	166	48	165	149	110	75	76	76
120	60	69	56	48	36	40	56	70	105	91	75	28	127	34	115	32	23	410	62	175	132	103	91	75	73
130	75	76	52	47	37	31	48	69	111	58	45	39	20	30	25	7	57	103	124	113	121	91	86	80	67
140	65	63	50	40	43	36	45	63	106	59	46	33	28	35	38	32	54	83	98	203	103	110	88	78	65
150	68	54	41	36	32	32	49	58	82	73	62	26	55	23	24	16	188	66	36	175	108	129	77	90	62
160	73	55	48	35	35	35	36	64	92	84	52	35	44	20	38	57	17	125	141	85	146	113	100	68	63
170	56	52	41	37	36	32	39	66	86	69	60	38	51	20	56	25	25	48	127	140	108	118	89	71	61
180	60	50	36	33	36	38	36	63	66	110	72	52	85	66	141	181	46	47	83	192	147	210	102	78	80
190	62	53	44	61	48	45	54	70	102	77	50	53	30	62	32	143	297	205	122	144	101	162	80	86	82
200	58	58	45	36	40	39	44	66	79	75	54	71	48	86	106	160	129	180	363	164	133	80	103	80	91
210	64	47	40	38	41	44	55	69	97	80	57	64	105	66	116	115	124	92	87	83	124	98	75	99	84
220	68	49	43	43	31	44	40	54	91	66	54	43	29	54	48	80	164	76	77	82	91	124	118	92	73
230	56	34	54	59	42	35	30	87	77	90	67	58	51	41	45	107	51	94	73	92	120	106	100	66	71
240	71	27	27	41	56	56	39	63	109	75	57	45	36	49	48	52	94	91	72	107	120	138	217	70	76
250	93	74	20	40	52	34	47	127	72	107	62	52	49	40	49	64	80	47	84	150	180	154	109	73	79
260	40	40	39	43	28	20	45	90	83	119	80	55	49	63	64	67	52	52	75	270	98	102	109	15	74
270	69	22	32	32	40	27	49	67	93	115	76	87	50	39	40	52	60	53	66	88	213	88	79	74	67
280	86	43	27	58	53	45	78	95	105	120	83	83	46	35	37	34	44	53	69	122	106	76	62	55	61
290	27	59	30	41	20	45	54	84	151	80	68	69	63	84	33	34	37	53	71	95	232	68	29	42	63
300	59	37	32	44	31	32	59	67	97	85	101	61	53	41	32	33	39	59	91	127	94	116		61	60
310	46	44	40	47	23	64	44	48	99	81	71	54	39	37	41	34	32	79	80	62	149	56	64	55	55
320	28	24	30	36	37	37	41	88	62	111	87	58	43	34	28	44	32	41	112	155	93	127	43	75	58
330	31	55	14	17	38	32	43	75	106	92	80	43	53	27	48	38	43	57	91	124	328	128	30	24	71
340	65	69	27	40	32	36	48	97	126	135	88	46	61	39	28	30	35	46	120	110	110	61	35	42	68
350	25	39	53	40	52	47	43	65	109	86	117	55	43	46	29	26	23	37	66	134	109	76	40	23	60
360	37	30	50	30	28	41	54	110	109	178	113	44	56	31	40	36	33	53	54	77	106	63	51	56	63
Averag	**71**	**57**	**47**	**41**	**38**	**38**	**47**	**74**	**96**	**89**	**74**	**63**	**60**	**52**	**53**	**61**	**62**	**79**	**103**	**127**	**129**	**111**	**90**	**76**	**72**

Color Scale:	0	50	100	150	200	250	300

Figure 2-25
Pinal County Housing Hourly PM10 Averages by Wind Speed (m/sec) and Hour of Day, All Data (No Outliers)

Pinal County Housing Hourly PM10 Averages by Wind Speed (m/sec) and Hour of Day, All Data

Averag	Colu																							
Row	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Average
0	68	57	45	43	38	39	50	82	110	106	81	73	60	37	47	44	46	75	134	141	132	118	96	77	79
1	65	61	48	42	40	40	48	76	102	92	71	52	42	35	30	28	30	45	78	107	118	103	84	73	65
2	54	42	38	32	33	31	41	63	80	71	52	42	40	34	30	29	32	42	55	71	122	79	63	61	49
3	46	60	34	22	27	25	30	49	68	54	48	45	39	35	37	55	53	51	54	69	96	86	65	71	52
4	55	45	171	33	38	33	49	53	83	79	50	57	64	41	50	65	64	73	86	134	152	180	191	86	77
5	170	42	25	94	58	34	38	64	82	77	142	85	65	109	111	106	119	344	324	203	289	144	406	121	144
6	91	79	83	50	56	28	17	98	42	141	271	285	185	257	263	253	336	295	834	679	225	508	140	1228	278
7	8449	301	23	96			25		137	325	309	372	931	294	269	565	412	598	208	716	1308	1190	335	181	521
8	95		40							289	450	784	593	395	794	586	822		543	3875	946		39	87	631
9									749			447		1398	412	1660		456	2471	3300	14				1229
10																	1328	3141		570		108			1287
11										740	0														370
Averag	71	57	47	41	38	38	47	74	96	89	74	63	60	52	53	61	62	79	103	127	129	111	90	76	72
Color Scale:		0	50	100	150	200	250	300																	

Summary – Mechanical dust sources within one mile of and surrounding the Pinal County Housing monitor appear to daily produce moderate PM10 concentrations, between 45 and 100 $\mu g/m^3$ at the monitor. Information on candidate sources fitting this profile should be collected at this site, possibly through interviews of residents or employees typically situated at or near the housing complex during daylight hours. Hours of maximum PM10 concentrations in excess of 1000 $\mu g/m^3$ should be investigated with respect to wind speed and direction to determine which of these continuous sources has the potential to generate high PM10 hourly values during episodic events. High wind events also appear to be responsible for high PM10 hours at the monitor. Back-trajectories of high wind hours on design days should be computed and the disturbance status of lands along these back-trajectories should be determined on these days through interviews of property owners or leasees. Land uses within 4 miles of the monitor in an arc from 90 to 230 degrees should be compared to those in the complementary arc to identify any differences that may contribute to the cumulatively higher impacts being generated in the former range of directions. Finally, the cause of nocturnal mitigation of emissions during wind speeds of 6 to 8 m/sec should be probed.

Inventory Focus – Mechanical source activity in areas immediately surrounding the Pinal County Housing monitor should be the focus of inventory data collection and analysis for the low wind day modeling inventory. On the high wind design day of January 1, 2008, the disturbance status of lands along the high wind hour back-trajectories should be assessed through interviews of property owners or lessees.

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3. DESIGN DAY SELECTION

3.1 Introduction

On February 3, 2011, the U.S. Environmental Protection Agency (U.S. EPA) designated the central portion of Pinal County as nonattainment for the 24-hour PM2.5 National Ambient Air Quality Standard (NAAQS), and designated the same area as attainment or unclassified for the annual PM2.5 NAAQS.[16] The rationale for the latter designation was based on the finding that the single monitoring site exceeding the annual standard, Cowtown, was a population-oriented microscale (i.e., localized hot spot) monitor that was not eligible for designation as a nonattainment site for the annual standard. On May 31, 2012, U.S. EPA designated a somewhat larger portion of central Pinal County as nonattainment for the 24-hour PM10 NAAQS.[17] The annual PM10 NAAQS was revoked by U.S. EPA on October 17, 2006. As a result of these decisions, the attainment demonstration for both PM2.5 and PM10 in Pinal County must be based on ambient air quality conditions and contributing emissions on specific design days.

Through discussions between U.S. EPA, ADEQ, and PCAQCD, a base year of 2008 was selected for the preparation of an emission inventory and an attainment demonstration. This is the year of the most recent triennial National Emission Inventory prepared by ADEQ and PCAQCD and approved by U.S. EPA. During 2008, exceedances of the 24-hour PM2.5 NAAQS were recorded at Cowtown, and exceedances of the 24-hour PM10 NAAQS were recorded at Maricopa, Cowtown, Stanfield, Casa Grande, Combs School, and Pinal County Housing. At each of these latter sites, continuously recording TEOMs are used to record hourly averaged PM10 ambient concentrations. At the Cowtown site, a filter-based instrument is used to record 24-hour average PM2.5 concentrations.

In an analysis of the relationship between PM2.5 and PM10 concentrations at Cowtown, ADEQ concluded that any control measures that will achieve attainment of the PM10 NAAQS will also yield attainment of the PM2.5 NAAQS.[18] This conclusion was based on the predominance of local source emissions, primarily from four nearby feedlots and disturbed soil surfaces, on elevated concentrations of both PM2.5 and PM10 measured at the Cowtown monitor. The monitoring data upon which this analysis was based were collected at the Cowtown station between 2006 and 2008.

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[16] Federal Register, Vol. 76, No. 23, Thursday, February 3, 2011
[17] Federal Register, Vol. 77, No. 105, Thursday
[18] Analysis of PM2.5 Exceedances in Pinal County Arizona: Demonstration that PM2.5 Concentrations are Driven by Local Sources of PM10 Near the Cowtown Monitor, Arizona Department of Environmental Quality, March 15, 2010

3.2 PM10 Exceedance Days

Each of the six monitoring sites deemed to be nonattainment for the 24-hour PM10 NAAQS recorded several exceedances of the 150 $\mu g/m^3$ standard. The numbers of exceedances recorded at each site in 2008 are presented in Table 3-1. The 24-hour average PM10 concentrations measured at each site on each monitoring day in 2008 are tabulated in Appendix A.

Table 3-1
Exceedances of 24-Hour Average PM10 and PM2.5 NAAQS at Pinal County Monitoring Sites in 2008

Monitoring Site	Number of Exceedances	
	PM10	PM2.5
Casa Grande	3	0
Combs School	4	N/A
Cowtown	173	7
Maricopa	6	N/A
Pinal County Housing	10	N/A
Stanfield	14	N/A

Initial evaluation of the relationships of hourly wind speed and PM10 concentration at the four sites with longer PM10 monitoring records indicated the presence of two primary meteorological scenarios that produced hourly PM10 concentrations in excess of the 24-hour NAAQS of 150 $\mu g/m^3$: high wind conditions, and stagnation conditions. The sources responsible for high PM10 concentrations are fundamentally different under these two scenarios. During high wind conditions, disturbed soil surfaces typically dominate the emission inventory and, because of the tendency of wind trajectories to remain somewhat constant during these periods, sources within a narrow band along the upwind trajectory and within one hour's transport distance of a monitor tend to significantly contribute to recorded PM10 concentrations. Conversely, during stagnation conditions, when wind speeds are typically below 3 mph, wind entrainment of loose soil particles is virtually nonexistent, and mechanical sources that lift particles into the air through combustion, vehicle movement, and other anthropogenic activities are primarily responsible for recorded PM10 concentrations. Additionally, because transport distances are relatively short under low wind conditions, only those sources within one mile in any direction of a monitor contribute to high hourly PM10 concentrations during stagnation conditions. Because of these differences in source mix and the need to demonstrate attainment under the range of meteorological conditions found at Pinal County monitors, a committee providing technical assistance to the development of the Pinal County PM2.5/PM10 State Implementation Plan (SIP) advised that at least one stagnation and

one high wind design day be selected for each nonattainment monitor ultimately selected for emission inventory and attainment demonstration development.

3.3 Stagnation Design Days

Table 3-1 shows that Cowtown is unique among the Pinal County monitoring stations with respect to PM10 exceedances. The proximity of stationary sources under permit to PCAQCD and transportation corridors to the Cowtown monitor in 2008 caused or significantly contributed to the very high number of PM10 exceedances recorded there in that year. While high wind conditions occurred on some of these exceedance days, a substantial number of exceedances occurred on stagnation days with little to no wind entrainment of loose soil particles nor wind transport of suspended PM10 over extended distances. Instead, mechanical sources caused the elevated PM10 impacts at the Cowtown monitor on stagnation days.

Some of these mechanical sources are common to most of the nonattainment PM10 monitoring sites. A control program that reduces emissions from these sources sufficient to attain the PM10 24-hour NAAQS at the stations other than Cowtown will provide air quality benefits to Cowtown and help define the reductions needed from sources that uniquely impact the Cowtown site. When this approach was endorsed by the SIP advisory committee, a list of PM10 exceedances occurring on stagnation days for stations other than Cowtown was assembled. This list is provided in Table 3-2.

Table 3-2 indicates that two monitoring sites—Pinal County Housing and Stanfield—exceeded the 24-hour PM10 NAAQS on one of the stagnation days, October 29, 2008. Table A3 in Appendix A shows that the Cowtown site also exceeded the 24-hour PM10 NAAQS on this date, and analysis of the meteorological data shows that October 29, 2008, was also a stagnation day at this site. Plots of hourly PM10 concentration, wind speed, wind direction, and mixing height recorded or modeled at each of these three monitoring sites on October 29, 2008, are presented in Appendix B. As each of the PM10 vs. Wind Speed plots show, wind speeds were low (typically less than 4 mph) and fluctuations in PM10 concentration did not correlate well with fluctuations in wind speed.

Table 3-2
PM10 Exceedances on Stagnation Days in 2008 at Monitoring Sites Other Than Cowtown

Date	Site	24-Hour Average PM10 Concentration ($\mu g/m^3$)
4/26/08	Stanfield	207.5
5/10/08	Stanfield	161.7
10/29/08	PCH	178.0
	Stanfield	162.1

These conditions are representative of stagnation conditions. Additionally, there were no high wind speed hours recorded at any of the three sites on this day. Because of these factors, October 29, 2008, was selected by the SIP advisory committee as the design day for the attainment demonstration under stagnation conditions at each of these three monitoring sites. Because no PM10 exceedances occurred on stagnation days at the Maricopa, Casa Grande, or Combs School monitoring sites, these sites were not included in the list of low wind speed attainment demonstrations to be addressed in the SIP.

3.4 High Wind Design Days

The control strategies needed to reduce emissions from high wind sources are different from those applicable to stagnation sources. High wind sources typically consist of disturbed soil surfaces that require shielding from the wind, covering of soil surfaces, or the consolidation of wind-entrainable surface particles into wind-resistant matrices in order to reduce PM10 emissions. High wind source emission strength is directly related to the magnitudes of wind velocity and disturbed surface area, and the soil texture. Stagnation sources typically involve mechanical or combustion processes from which PM10 emissions can be controlled through either pre-treatment of emission-generating materials or the capture of PM10 released by these processes. In sum, PM10 concentrations from wind events are primarily proportional to the areas of wind-affected soils, while concentrations from stagnation events are proportional to activity rates of mechanical sources.

Control strategies for high wind sources are best developed from the analysis and modeling of design days during which only these sources are contributing to ambient PM10 concentrations. To identify days on which these conditions existed, the PM10 exceedance days recorded at each of the six nonattainment monitoring sites were screened for hourly average wind speeds during hours of high PM10 concentrations. From limited analysis of the relationships between hourly wind speeds and PM10 concentrations over the 2008 baseline year at the monitoring stations continuously sampling these parameters, an average wind speed of 12 mph was estimated to be the threshold velocity for the generation of significant PM10 emissions from disturbed soil surfaces and was chosen as the definitional cut point for the identification of high wind hours in the 2008 meteorological record.

3.5 Cowtown

Several criteria were used to select the high wind day at the Cowtown monitoring site. These included the 24-hour average PM10 concentration for the day, the number of hours during which the hourly average wind speed exceeded 12 mph, the number of hours during which the high winds blew from areas other than the directions of the nearby stationary and transportation sources, and the correlation between hourly wind speeds and PM10 concentrations. These statistics are tabulated for the candidate high wind days at Cowtown in 2008 in Table C1 in Appendix C. The initial list of high wind days shown in the table represents those days on which the hourly wind speed exceeded 12 mph for at least one hour during the day.

The high wind PM10 exceedance days in the Appendix C table are ranked by 24-hour PM10 concentration. The screening criteria enumerated above were used sequentially to eliminate days from consideration, starting at the top of the table and working down. The average number of high wind hours per day was calculated to be 4.03 on PM10 exceedances days. Days reporting 4 or fewer high wind hours were removed from consideration as these days either included hourly PM10 concentrations in excess of 150 $\mu g/m^3$ during low wind hours (suggesting the influence of stagnation day sources), or resulted from very high PM10 concentrations for four or fewer hours in a day, such as result from passage of monsoon winds, which would normally qualify as an exceptional event because of the overpowering of emission controls qualifying as best available control measures. This screen reduced the number of candidate days from 36 to 11, but retained the top two highest PM10 days: May 21 and November 9, 2008.

Emission reductions at the stationary sources and transportation corridors south and west of the Cowtown monitor are expected to be critical to the attainment of the 24-hour PM10 NAAQS on stagnation days. The controls developed to achieve these reductions are also expected to significantly reduce windblown PM10 emissions from these facilities. In order to develop a control strategy that will be effective on all high wind days, a high wind design day during which high winds blow from sources other than those to the south and west is desirable. In the second screening of candidate days, the number of high wind hours during which the wind blew from sources other than those to the south and west—i.e., when the wind was blowing from a direction greater than 303 degrees or less than 134 degrees—were tabulated and days with 0 high wind hours meeting this condition were eliminated from consideration. As the table in Appendix C shows, this condition reduced the candidate days from 11 to 4: October 27, September 29, April 27, and November 21, 2008.

Review of hourly plots of wind speed and PM10 concentration for stagnation days in Appendix B demonstrated that a final criterion for screening high wind days should be the correlation of hourly PM10 concentration to wind speed. This was deemed to be useful since, in view of the many elevated PM10 concentrations recorded during low wind conditions at Cowtown, the recording of a high PM10 concentration during a low wind hour could be due to emissions from mechanical sources observed frequently by PCAQCD inspectors at Cowtown that would adversely skew the analysis of high wind source impacts at the monitoring site. The correlation between hourly wind speed and PM10 concentration was computed for each day at Cowtown in 2008, and the resulting values were included in Table C1 in Appendix C. Review of these values shows negative correlations on October 27 and September 29, and positive correlations on April 27 and November 21, 2008. Of these latter two days, April 27 has the higher correlation value and the higher 24-hour PM10 concentration. On this basis, April 27, 2008 was selected by the SIP advisory committee as the high wind design day for the Cowtown monitoring site. The hourly profiles of PM10 concentrations, wind speed, wind direction, and mixing height for this date are shown in the plots contained in Appendix C.

3.6 Stanfield

During 2008, exceedances of the PM10 24-hour standard were recorded at Stanfield on 11 days on which the hourly wind speeds exceeded 12 mph for at least one hour. These dates, together with PM10 and wind speed statistics, are presented in Table D1 in Appendix D. The dates are ranked by highest-to-lowest 24-hour average PM10 concentration measured at the Stanfield monitor.

In the first screening of these data, days with fewer than the average number of high wind hours for the days listed were eliminated from consideration as the design day should include a greater-than-average number of high wind hours. The average number of high wind hours calculated for these exceedances is 6.2 hours per day. This initial screen reduced the candidate exceedances days from 11 to 6. The remaining candidate days, having at least 7 high wind hours each, were November 9, May 21, January 1, November 15, November 21, and December 13, 2008.

These remaining days were further screened by the correlation of hourly PM10 concentration to wind speed. The date with the highest correlation, May 21, 2008, was further evaluated by reviewing the hourly plots of PM10 concentration, wind speed, wind direction, and mixing height. These plots are also presented in Appendix D. The plot of PM10 concentration and wind speed, Figure D1, shows a significant drop in PM10 concentration at 1400 hours and then a return to previous hourly values without any corresponding drop in wind speed. It is unclear what might have caused this anomalous fluctuation in PM10 concentration, but the lack of a change in wind speed causes this day to be questionable as a high wind design day candidate.

The day with the next-highest correlation between PM10 concentration and wind speed was November 9, 2008. Plots of hourly PM concentrations, wind speeds, wind directions, and mixing heights for this day appear in Figures D4 through D6. Like May 21, this candidate design day also shows a significant decline in PM10 concentration at 1200 hours and a slow return while wind speeds steadily increase. This precipitous drop in hourly PM10 concentration and later return similarly cannot be explained. The use of these data to calculate and model windblown dust emission rates, however, would lead to both errors in the emission rates and the lack of good correlation between modeled and monitored PM10 concentrations at the Stanfield monitor. For this reason, November 9, 2008, was questioned as a design day candidate.

The day with the third-highest correlation between hourly PM10 concentrations and wind speeds was December 13, 2008. Plots of hourly PM10 concentrations, wind speeds, wind directions, and mixing heights for this day are presented in Figures D7 through D9. Figured D7 shows a short-term drop and return in PM10 concentration commencing at 1200 hours without any decline, and in fact an increase, in hourly wind speed, which raises the same questions of modeling accuracy discussed above for May 21 and November 9, 2008. Like these two latter candidate days, December 13, 2008, was questioned as a candidate for the high wind design day for the Stanfield site.

The day with the fourth-highest correlation between hourly PM10 concentrations and wind speeds was November 21, 2008. Plots of hourly PM10 concentrations, wind

speeds, wind directions, and mixing heights for this day are presented in Figures D10 through D12. Although this day shows a small decline in PM10 concentration at 0800 hours, the drop is far less dramatic than is evidenced in the three candidate days with higher PM10 concentration-to-wind speed correlations. As a result of this smoother hourly PM10 profile and the relatively good statistics in the categories evaluated, November 21, 2008 was chosen as the high wind design for the Stanfield site.

3.7 Pinal County Housing

The monitoring station at Pinal County Housing recorded seven exceedances of the PM10 24-hour standard on high wind days in 2008. These dates, together with PM10 and wind speed statistics, are presented in Table E1 in Appendix E.

The process of choosing a high wind design day for the Pinal County Housing site followed a process similar to that used at the Cowtown site. First, high wind days were sorted into those that recorded more than 4 hours of hourly average wind speeds greater than 12 mph. This had the effect of excluding short duration, monsoonal-related, high wind days from the analysis, and reduced the list from seven candidate days to three: June 21, January 1, and October 27, 2008. The correlation values of hourly wind speed to PM10 concentration were then compared for these three days. Although October 27, 2008, recorded the highest correlation, this date had the lowest 24-hour average PM10 concentration and the lowest number of high wind hours of the three candidate days. January 1, 2008, recorded the second-highest correlation between hourly wind speeds and PM10 concentrations, and had the second-highest 24-hour average PM10 concentration. The 24-hour average PM10 concentration on June 21, 2008, was only 4% higher than that of January 1 (271 vs. 260 $\mu g/m^3$), but the wind speed/PM10 concentration correlation for June 21 was 27% lower than that of January 1. Based on these considerations for the two top candidate days, January 1, 2008, was selected as the high wind design day for Pinal County Housing. Plots of hourly PM10 concentration, wind speed, wind direction, and mixing height for January 1 are also presented in Appendix E.

3.8 Maricopa

In 2008, six exceedances of the PM10 24-hour standard were recorded at the Maricopa monitor. All of these exceedances occurred on high wind days. Wind and PM10 statistics for each of these days are presented in Table F1 in Appendix F.

Until the modeling domains for low wind and high wind days at the Cowtown monitoring site were established, the working assumption of the SIP steering committee was that the emission control strategies demonstrating attainment at this site would simultaneously demonstrate attainment at the Maricopa site. When the Cowtown modeling domains were selected, the committee realized that the Maricopa site was sufficiently distant from these study areas as to invalidate this working assumption. Upon that realization, the committee agreed to develop a separate emission inventory focus and attainment demonstration based on a modeling domain specific to the Maricopa site.

The selection of a high wind design day for the Maricopa site was based primarily on the number of high PM10 hours recorded on each candidate day. On May 21, 2008, hourly PM10 concentrations spiked at 1300 hours at an hourly average value of 1704 $\mu g/m^3$, but levels in both the preceding and succeeding hours were below 920 $\mu g/m^3$. During the same hours, hourly average wind speeds remained fairly constant, suggesting a poor correlation between wind speed and PM10 concentration during 1200 to 1400 hours. Because of this lack of good correlation, this date was not considered to be a good candidate for a design day.

On August 7, 2008, hourly PM10 concentrations also spiked for a three-hour period in the late evening. Hourly wind speeds followed a similar trend, suggesting the presence of a thunderstorm outflow on this day. Because hourly PM10 concentrations exceeded the 24-hour standard for only three hours, this day was also deemed not to be a good candidate for a design day.

Another three-hour PM10 spike was recorded on September 11, 2008. Although this spike corresponded to a similar rise and fall in hourly average wind speed, the very limited number of hours of high PM10 concentrations also eliminated this day from consideration as a design day.

Hourly PM10 concentrations exceeded the 24-hour standard for a period of seven non-contiguous hours on October 11, 2008. Although hourly wind speeds were close to or exceeded 12 mph during these hours, there is little correlation between wind speed and PM10 concentration during the high PM10 hours. As a result, this day was also not considered to be a good candidate for a design day.

The 24-hour PM10 standard was exceeded on six successive hours on October 27, 2008. The rise of hourly PM10 concentrations between 0700 and 0900 hours on that day closely followed the rise in hourly wind speeds. Although hourly average wind speeds remained elevated through 1600 hours, hourly PM10 concentrations fell between 0900 and 1200 hours back to the level of the 24-hour standard and continued to decline slowly through the remainder of the day. This relationship suggests that contributing windblown dust sources contained limited reservoirs of abradable material, and that these reservoirs were exhausted by hourly wind speeds peaking at 18 mph at 0900 hours. The good correlation between hourly wind speed and PM10 concentration during the rise in PM10 and the continuing decline in hourly PM10 concentration after the daily peak make this day a reasonable candidate for a high wind design day.

On the last PM10 exceedance day in 2008 at the Maricopa monitor, which occurred on November 9, 2008, hourly PM10 concentrations rose and fell in two spikes of two hours duration each, while hourly wind speeds gradually rose from the beginning of the first spike at 1,000 hours to the peak for the second hourly PM10 spike at 1600 hours. The poor correlation between hourly wind speed and PM10 concentrations during this interval makes this day a poor candidate for a design day.

Based on the analyses of each PM10 exceedance day recorded in 2008 at the Maricopa monitor, the advisory committee selected October 27, 2008, as the high wind design for

this monitoring site. Hourly plots of wind speed, wind direction, mixing height, and PM10 concentration for this day are shown in Figures F-1 through F-3 in Appendix F.

3.9 Combs School and Casa Grande

All of the PM10 exceedances recorded at the Combs School and Casa Grande sites in 2008 occurred on high wind days. Like the Maricopa site, the SIP steering committee assumed that a high wind day attainment demonstration developed for the Casa Grande site would also demonstrate PM10 attainment at the Combs School site due to proximity and a similar set of disturbed soil land uses impacting each site. The Casa Grande site was subsequently determined to be impacted not by local emission sources, but only by regional windblown dust sources that would be subject to control under the attainment strategies developed for the Cowtown, Stanfield, Maricopa, and Pinal County Housing sites. At this point, the committee conducted a limited analysis of hourly PM10 and wind relationships on exceedance days, and concluded that the high wind control strategies that would bring the Casa Grande site into attainment would also provide the same benefit at the Combs School site. As a result, these sites were not chosen for development of modeling domain emission inventories or attainment demonstrations.

3.10 PM2.5 Exceedance Days

The national 24-hour ambient air quality standard for PM2.5 of 35 $\mu g/m^3$ was exceeded at only the Cowtown monitoring station during 2008. A tabulation of the 24-hour average PM2.5 concentrations, PM10 concentrations, and wind speed statistics for these days is shown in Table G1 in Appendix G. The exceedance days are ranked in the table from highest to lowest 24-hour average PM2.5 concentration for each day.

PM2.5 is collected by a filter-based sampler that produces only 24-hour average concentrations at the Cowtown station. Hourly average values of PM2.5 are not available from this type of monitoring. As a result, fluctuations in hourly PM10 concentrations were evaluated as a surrogate for hourly PM2.5 values, based on the close correlation between PM10 and PM2.5 concentrations reported in an analysis conducted by ADEQ.

At the Cowtown monitoring site, PM10 concentrations are dominated by emissions from south and west of the monitor. Because of the close correlation between 24-hour average PM10 and PM2.5 concentrations recorded at this site, it is logical that PM2.5 concentrations are also heavily influenced by emissions from the stationary sources and transportation corridors in these directions. As a result, the PM2.5 design day should not be a high wind day, but rather a day in which wind directions are from the south or west to the monitor at wind speeds less than 12 mph. The hourly PM10 concentrations, wind speeds, wind directions, and mixing heights of the days listed in Table G1 were plotted and reviewed using these criteria in selecting a PM2.5 design day. These plots are presented in Figures G1 through G21 in Appendix G.

The day with the highest PM2.5 concentration—March 25, 2008—has a single hour with a very high PM10 concentration that represents approximately 40% of the 24-hour

average for that day. Because of the very small number of high PM10 concentration hours, this date was not considered to be a good candidate for the PM2.5 design day.

The day with the second-highest PM2.5 concentration—April 12, 2008—contains a similar evening PM10 spike spanning three hours. This spike represents approximately 79% of the 24-hour average for this day. Again, because of the small number of high PM10 hours, this date was not considered to be a good candidate for the PM2.5 design day.

The day with the third-highest PM2.5 concentration—May 6, 2008—includes two hours with the highest PM10 concentrations when wind speeds exceeded 12 mph. Because of the desire to avoid days when high winds caused high PM10 concentrations that dominated the 24-hour average, this day was not considered to be a good candidate for the PM2.5 design day.

The day with the fourth-highest PM2.5 concentration—April 30, 2008—also contains a single high PM10 hour during which the wind speed exceeded 12 mph. Because of this high wind contribution, and the significant contribution made by this single hour to the 24-hour average concentration, this day was also not considered to be a good candidate for the PM2.5 design day.

The day with the fifth-highest PM2.5 concentration—November 20, 2008—includes a major PM10 peak spanning four hours in the evening and a minor PM10 peak in the early morning spanning two hours. None of the hours spanned by these peaks exceeded the assumed high wind speed threshold of 12 mph. In the absence of concerns raised in the days with higher PM2.5 24-hour concentrations, this day was considered to be a reasonable candidate for the PM2.5 design day.

The day with the sixth-highest PM2.5 concentration—June 23, 2008—contains several PM10 peaks spread throughout the day. The most significant of these peaks, spanning two hours in the late evening, occurs when hourly average wind speeds are between 10 and 12 mph, approaching the high wind threshold. Because of the presence of these two hours with elevated wind speeds, this day was considered to be a marginal candidate for the PM2.5 design day.

The day with the seventh-highest PM2.5 concentration—April 18, 2008, has an evening PM10 spike spanning three hours and a missing hour of PM10 data at 0900 hours. The evening PM10 spike represents approximately 40% of the 24-hour average PM10 concentration for this day. Because of the missing PM10 hour and the significant contribution of the evening PM10 spike, this day was not considered to be a good candidate for the PM2.5 design day.

As a result of the screening analysis summarized above, November 20, 2008 was selected as the PM2.5 design day for the Cowtown site.

Summary – For the purpose of demonstrating attainment with the national 24-hour PM10 ambient air quality in central Pinal County, emission inventories will be prepared for modeling use in the source areas surrounding each of the Cowtown, Maricopa, Pinal

County Housing, and Stanfield air quality monitoring stations. Separate modeling domains for stagnant design days and high wind design days will serve as the basis for modeling inventory preparation at each of the Cowtown, Pinal County Housing, and Stanfield monitoring sites. For the Maricopa site, only a high wind design day modeling domain will be developed. Finally, a PM2.5 design day modeling domain will be prescribed for the Cowtown site. Table 3-3 lists the design days for which inventory preparation will also focus at each attainment demonstration site.

Table 3-3
Summary of Selected Design Days

Design Day Character	Site	Date	24-Hour Average PM10 Concentration ($\mu g/m^3$)
High Wind Days	Cowtown	April 27, 2008	168.3
	Pinal County Housing	January 1, 2008	264.9
	Stanfield	November 21, 2008	178.6
	Maricopa	October 27, 2008	159.4
Stagnant Days	Cowtown	October 29, 2008	188.8
	Pinal County Housing	October 29, 2008	178.0
	Stanfield	October 29, 2008	162.1
$PM_{2.5}$ Day	Cowtown	November 20, 2008	345.0

3.11 Modeling Domains

Emission inventory preparation will focus on emissions generated within the attainment demonstration modeling domain surrounding each PM10 monitor for which a design day was selected. For the central Pinal County PM10 nonattainment area, these monitoring sites include Cowtown, Maricopa, Pinal County Housing, and Stanfield. Because separate stagnation, high wind, and PM2.5 design days were selected for each affected site, separate modeling domains were also developed to correspond to each design day.

Different modeling domains were developed for stagnation and high wind design days because the source categories significantly impacting monitors under each of these of meteorological conditions are quite different. On stagnation days, PM10 is entrained into the air only through the action of mechanical sources—such as motor vehicles, farm equipment, and industrial machinery—either releasing quantities of fine particulate matter through production processes or dislodging fine particulate lying on soil surfaces, with sufficient force to discharge the particulate into the air. Once suspended in the air, these particles travel limited distances—because of the lack of lateral air movement during stagnation conditions—before settling out the air again within an hour or so. This

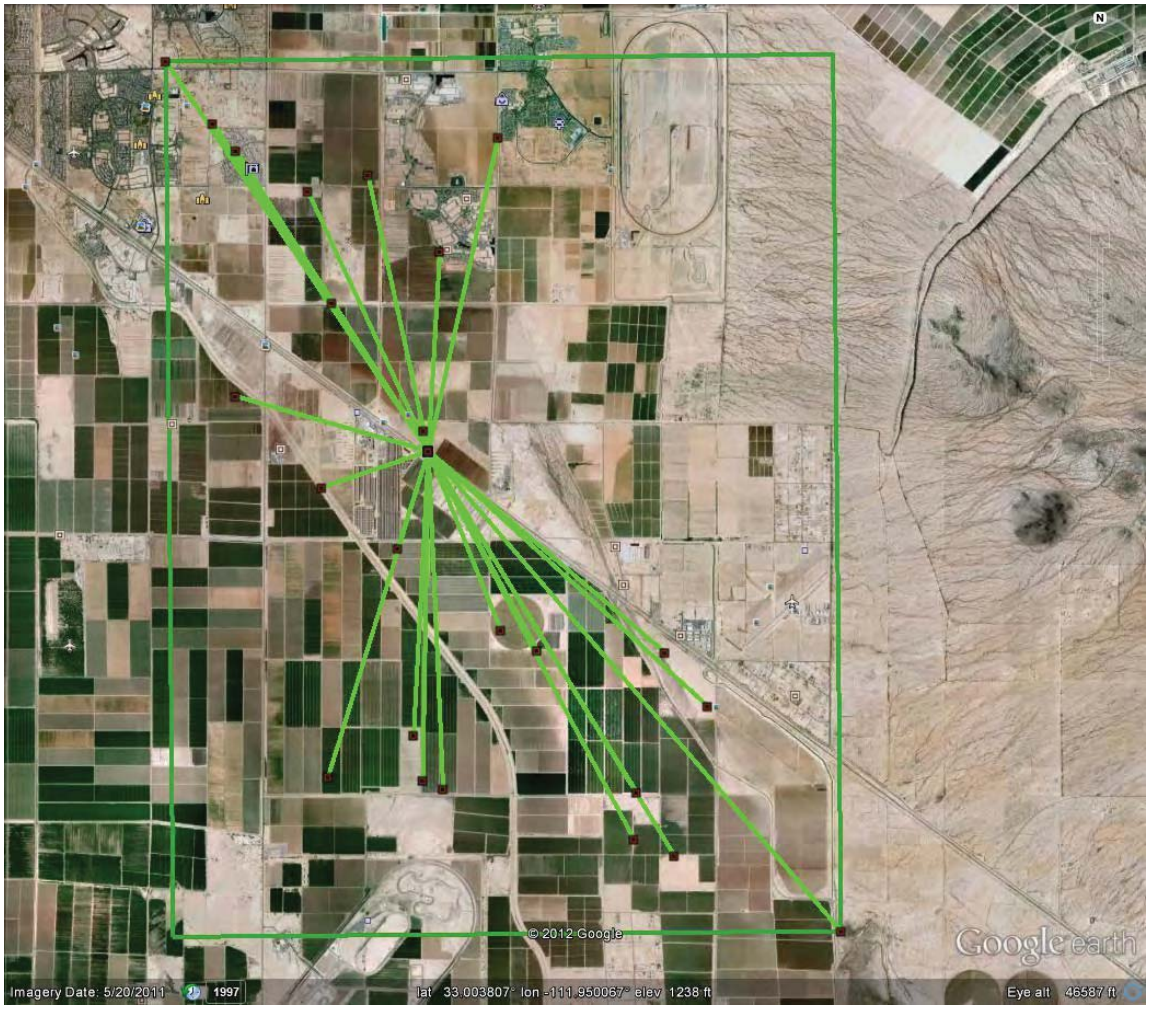
condition of limited travel means that sources whose emissions impact a monitoring site on such a day are typically located quite close to the monitor.

The types and locations of sources whose emissions significantly impact PM10 monitors on high wind days are considerably different from significant stagnation day sources. During high wind hours, when hourly average wind speeds nominally exceed 12 mph, windblown dust sources—most of which are disturbed soil surfaces—produce high concentrations of ambient PM10 that significantly exceed concentrations produced by mechanical sources in the same area. Research has demonstrated that the flux of PM10 in the vertical direction above disturbed soil surfaces is proportional to the speed of the wind, above a certain threshold velocity, blowing horizontally over the soil. This research has also demonstrated that below this threshold wind speed, windblown dust emissions from disturbed soil surfaces are much lower.[19] This condition is explained by the fact that the saltation (bouncing) of sand particles over soil surfaces is the primary cause of fine particles being dislodged from surface matrices and lifted into the air by turbulent eddies to produce airborne PM10 concentrations. Below the threshold wind speed, sand particles remain at rest on soil surfaces and no significant PM10 emissions are generated. Once entrained in the air, PM10 particles can be blown considerable distances depending on the velocity of the wind during transport. With time, however, suspended PM10 particles settle out of the moving air mass and are also widely dispersed laterally and, to a less extent, vertically due to increased groundlevel turbulence at higher wind speeds. As a result, windblown dust sources located a number of miles upwind can contribute to measured concentrations at a monitor, but those that significantly impact a PM10 monitor during a high wind hour are more typically within a few miles upwind of the monitor.

The settling velocities of PM10 particles cause a majority of particles entrained from soil surfaces to settle out of the air within an hour after initial entrainment. This characteristic of PM10 facilitated the process by which modeling domains for stagnation and high wind days were selected. On stagnation days, when wind velocities were typically less than 4 mph throughout the day, particles arriving at the monitor were assumed to have traveled no more than one hour at the average wind velocity recorded at the monitoring station for that hour. The starting point for each hourly trajectory of emissions from windblown dust sources to the monitor was determined by plotting the back-trajectory of the hourly wind parcel from the monitor to the emission source on the basis of that hour's wind speed and direction. The starting points of each hourly wind trajectory ending at the monitor were plotted on an aerial photograph of the area surrounding each stagnation design day, and rectangles with sides aligned with the cardinal compass directions were drawn to bound all of the trajectory origin points. A diagram showing each hourly wind trajectories and the rectangular boundary enclosing all of the origin points for the Cowtown monitor on the stagnation design day of October 29, 2008, is presented in Figure 3-1.

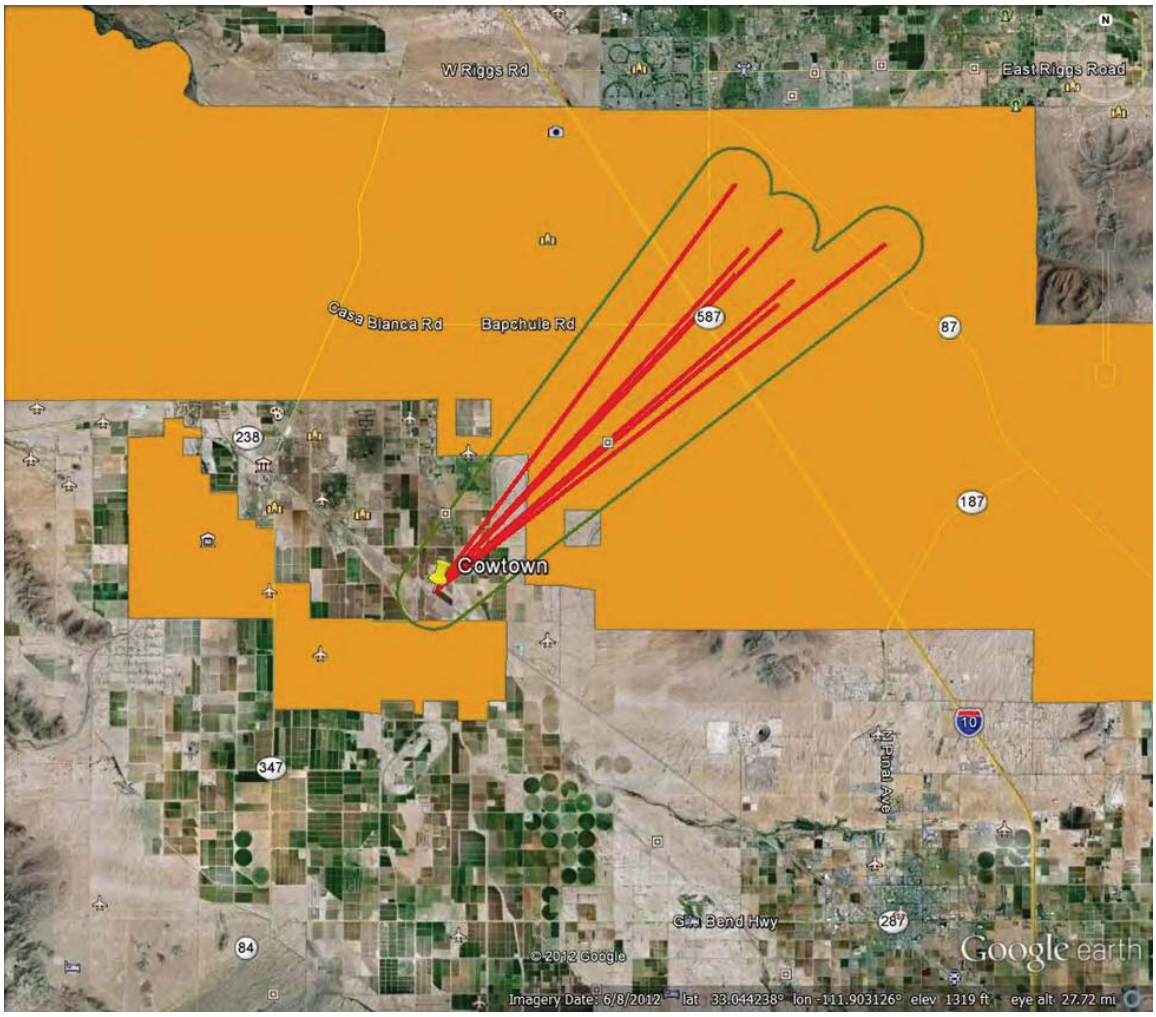
[19] The Physics of Blown Sand and Sand Dunes, Bagnold, Ralph A., Dover Publications, Mineola, New York, 2005

Figure 3-1
Cowtown Stagnant Design Day Modeling Domain



During high wind hours, wind directions tend to be less variable than those recorded hourly on stagnation days. Analyses of area source plume behavior contained in technical support documents of earlier PM10 attainment planning in Arizona, indicated that windblown dust sources lying more than one mile laterally from the centerline of the one hour wind back-trajectory centerline contributed less than 1% to the PM10 concentrations measured at a monitor, assuming that windblown dust emission factors were uniform across all upwind disturbed soil surfaces. This finding guided the design of high wind hour modeling domains that were centered over one-hour wind back-trajectories and extended one mile laterally from each centerline. An example of this type of modeling domain for high wind hours on April 27, 2008, at the Cowtown monitor is shown in Figure 3-2.

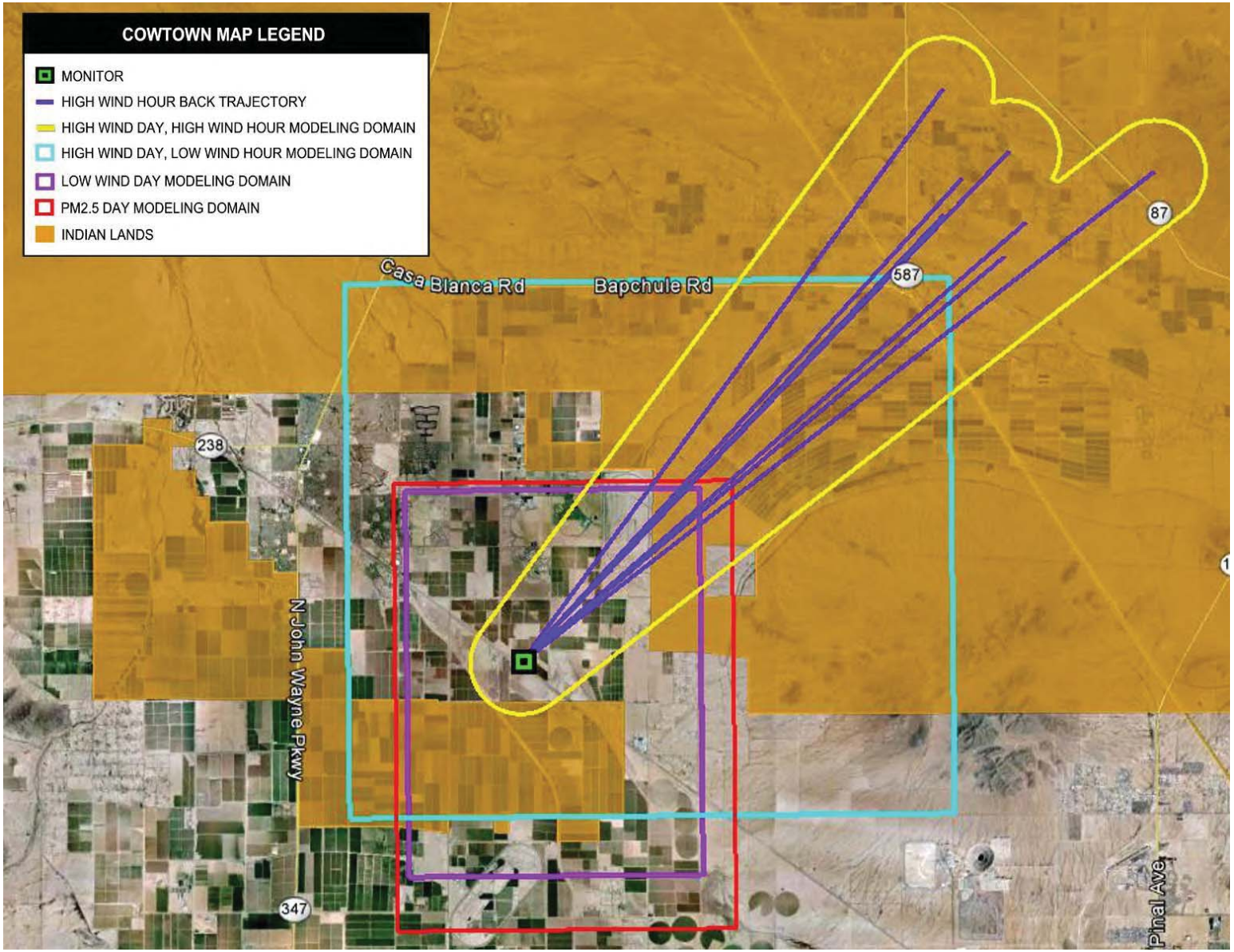
Figure 3-2
Cowtown High Wind Hour Modeling Domain During the High Wind Design Day



Cowtown – The Cowtown monitor will be the subject of three attainment demonstrations in the Pinal County PM SIP: a stagnation day PM10 demonstration, a high wind day PM10 demonstration, and a peak day PM2.5 demonstration. Each of these attainment demonstrations will be based on the modeling of controlled emissions within modeling domains whose boundaries will be set using the protocols described above. A map of the various modeling domains proposed for the Cowtown demonstrations is presented in Figure 3-3.

In Figure 3-3, the modeling domains for the stagnation day, October 29, 2008, and the PM2.5 peak day, November 20, 2008, are very similar. As a result, the larger modeling domain for the PM2.5 peak day will be used for both attainment demonstrations, and emission data from sources of both PM10 and PM2.5 will be collected simultaneously in this domain to serve both modeling efforts.

Figure 3-3
Cowtown



Maricopa – A map of the high and low wind hour modeling domains for the high wind day (October 27, 2008) attainment demonstration is provided in Figure 3-4. Because a substantial portion of the high wind hour modeling domain for the Maricopa demonstration overlays the high wind hour modeling domain for the Cowtown monitor, a single data collection effort will be undertaken to quantify windblown PM10 emissions from exposed soil surfaces common to both domains.

Pinal County Housing – The modeling domains for the Pinal County Housing (PCH) attainment demonstration do not overlay those of any other PM10 monitoring site. The location of these domains in relation to the PCH site is displayed in Figure 3-5. Emissions data will be collected in these domains following the same protocols used for the other design day monitoring sites.

Stanfield – The high and low wind modeling domains to be used in the Stanfield attainment demonstration lie just to the south of those to be used for the Cowtown modeling. As a result, the modeling domains share similar emission source mixes, and may well share similar emission factors for significant source categories. A map showing the location of the Stanfield modeling domains is presented in Figure 3-6.

Figure 3-4
Maricopa Modeling Domains

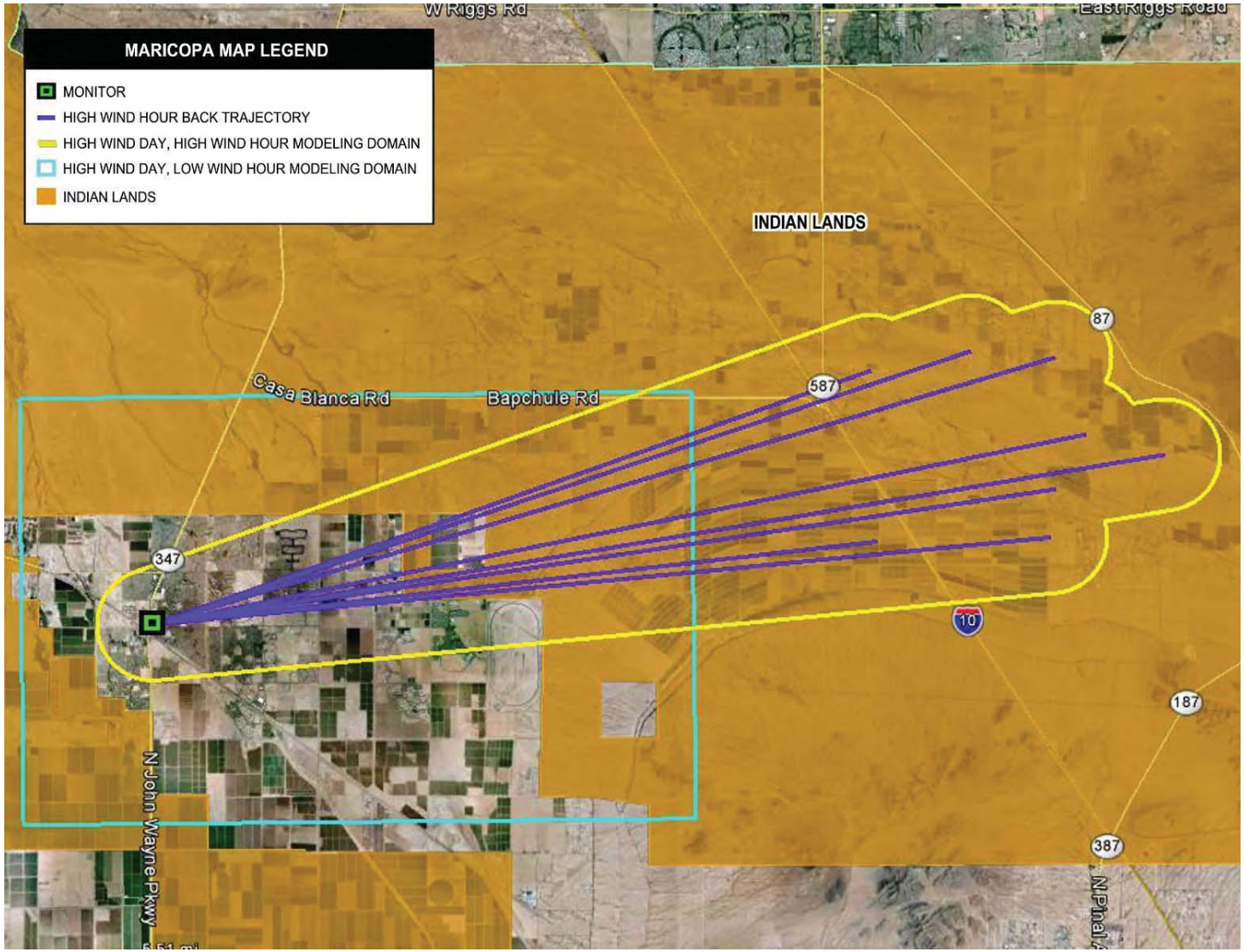


Figure 3-5
Pinal County Housing Modeling Domains

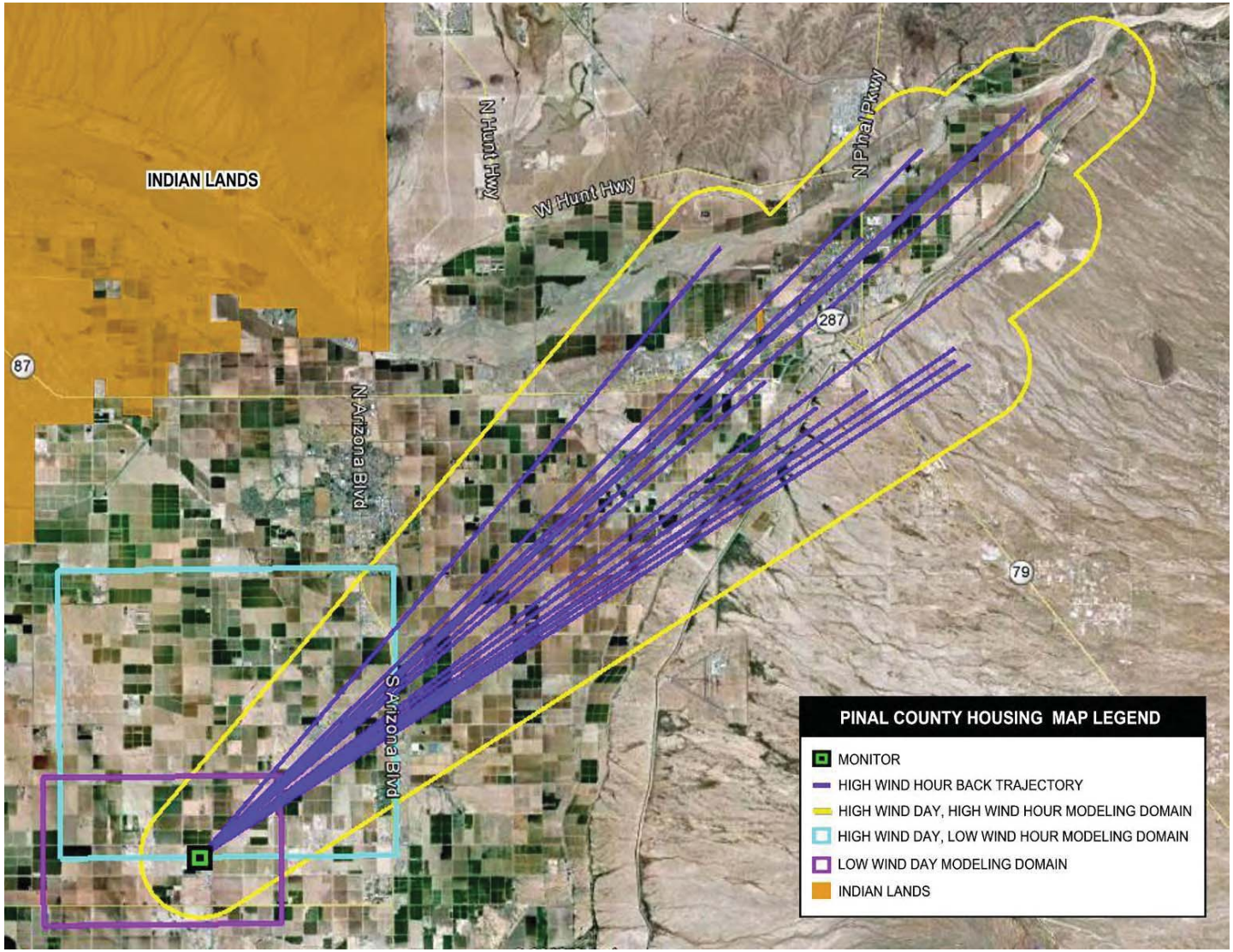
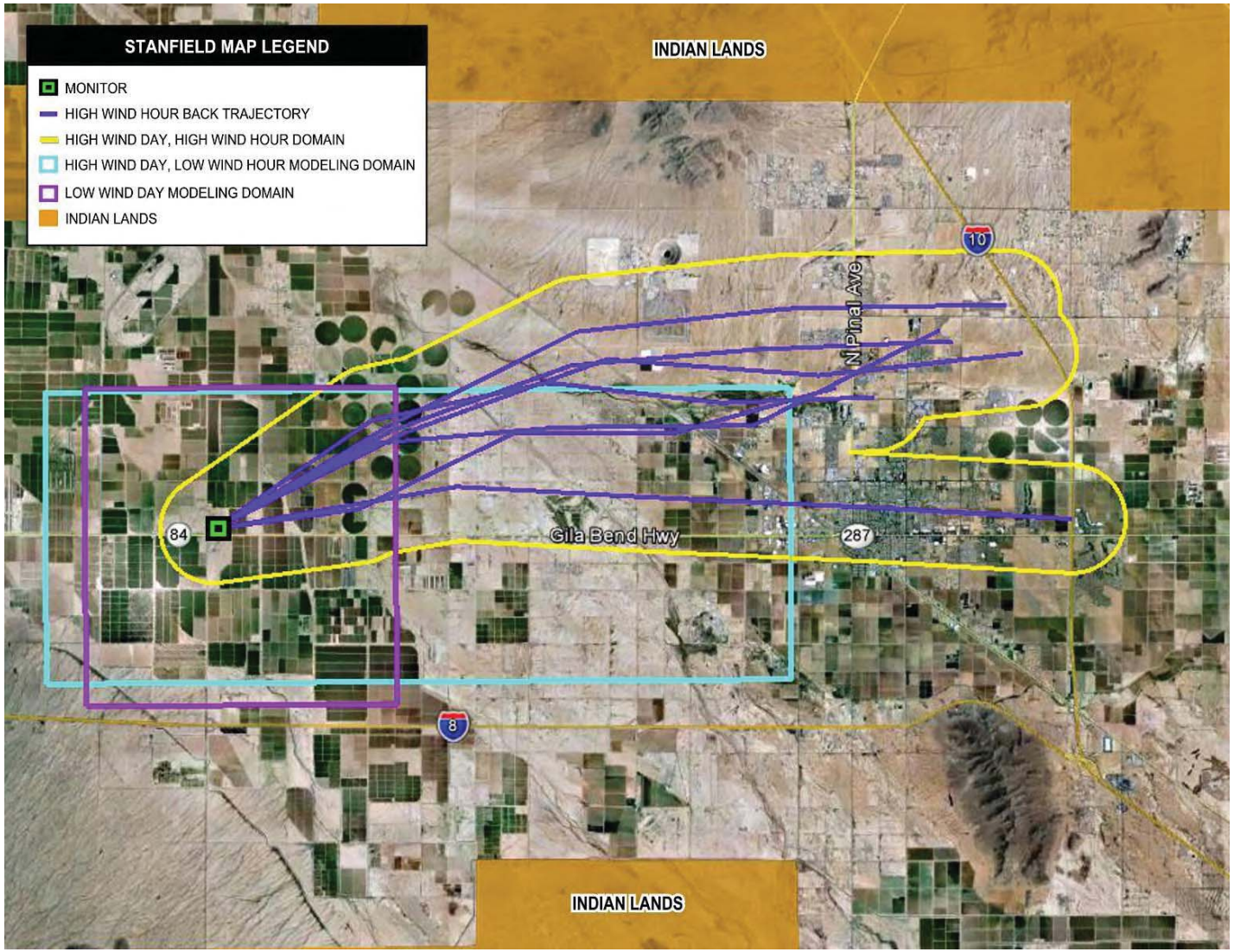


Figure 3-6
Stanfield Modeling Domains



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4. EMISSION INVENTORY PROCEDURES AND DATA SOURCES

As discussed in Section 3, for the purpose of design day selection, PM10 exceedance days in 2008 were divided into separate low and high wind event categories based on the 12 mph threshold velocity for generation of windblown dust. This threshold was estimated from limited analysis of the relationships between hourly wind speeds and PM10 concentrations over the 2008 baseline year at the monitoring stations continuously sampling these parameters. Low wind or stagnation event sources typically involve mechanical or combustion processes from which PM10 emissions can be controlled through either pre-treatment of emission-generating materials or the capture of PM10 released by these processes. High wind sources typically consist of disturbed soil surfaces that require shielding from the wind, covering of soil surfaces, or the consolidation of wind-entrainable surface particles into wind-resistant matrices in order to reduce PM10 emissions. Separate discussions of methods and data sources available to quantify emissions under low and high wind conditions are presented below. These discussions presented in this section provide a greater emphasis on area sources as previous studies[20] indicate that the crustal component of area source emissions comprise a significant portion of the overall inventory. As a result, available resources will be more heavily focused on these area source emissions calculations, whereas point and mobile source emissions calculations will utilize more standard methodologies that require less discussion.

4.1 Low Wind Emissions

Point Sources – Point sources refer to stationary facilities that release emissions to the air primarily through stacks or flues. Such facilities may also release "fugitive" emissions to the air from non-stack sources (e.g., evaporative emissions from leaks in pump seals, valves, and flanges), but the presence of emitting stacks places such facilities in the "point" source category. (Facilities with stack sources and facility-wide emissions below a certain limit or "cutoff" are treated as area sources. This section of the IPP discusses the key issues, available data, and procedures for the development of a point source emissions inventory.)

[20] Summary of Findings Report for the RARE Pinal County Source Apportionment Study. *http://www.pinalcountyaz.gov/Departments/AirQuality/Documents/Monitoring%20Network/RARE_Report_v4_1.pdf*

Land use files supplied by the Pinal County Air Quality Control Department (PCAQCD) identified a total of 44 industrial point sources within the nonattainment area in 2008 (see the land use discussion later in this section). All facilities emitting 5.5 lbs/day or 1 ton per year from stacks or vents are required to obtain permits. Annual and typical daily emission estimates for these facilities can be determined from annual source emission reports, PCAQCD investigation reports, permit files and logs, or telephone contacts with sources. For most of the sources, material balance methods will be used to determine activity rates for vented sources. Emissions will be calculated using the emission factors from AP–42, source tests, engineering calculations, or manufacturers' specifications.

PCAQCD distributes annual emissions survey forms to nearly all facilities to which operating permits have been issued. Facilities are required to report detailed information on stacks, control devices, operating schedules, and process-level information concerning their annual activities. These instructions include examples and explanations on how to complete the annual emissions reporting forms that facilities must submit to PCAQCD.

Annual emission inventory reports include calculated process-level emissions for PM10, NOx, SOx, and NH_3 from each vented source at each facility. Actual emissions for these pollutants are calculated using cited emission factors (from AP–42 or source test results) and estimated efficiencies of any control devices installed. PM2.5 emissions are typically calculated as a fraction of PM10 emissions, depending on the Source Classification Code (SCC) of the process reported, as outlined below.

- For those SCCs and control device combinations included in EPA's *WebFIRE*, this database will be used to calculate PM2.5 on the basis of EPA-recommended emission factors and typical control efficiencies.

- For processes with no PM10 controls, emission factors for PM2.5 published by the California Air Resources Board (CARB, 2004) will be used where available.

- For all other processes (where neither of the above resources provided guidance), PM2.5 will be assumed equal to PM10 as a conservative estimate.

Air quality planners are required to check inventory accuracy and reasonableness, and assure that all point sources have been identified and that the methodology applied to calculate emissions is appropriate and that the calculations are correct. Other reasonableness checks include recalculating emissions using methods other than those used to make the initial emissions calculations and comparing results. QA needs to be conducted by checking all emissions reports submitted to PCAQD for the year 2008 for missing and questionable data and by checking the accuracy and reasonableness of all emissions calculations made for such reports. Notes concerning follow-up calls and corrections to calculations need to be documented on each 2008 annual emissions report.

The QA point source coordinator should review and check calculations, identify errors, and perform completeness, reasonableness and accuracy checks.

Area Sources – Area sources are facilities or activities whose individual emissions do not qualify them as point sources. Area sources represent numerous facilities or activities that individually release small amounts of a given pollutant, but collectively can release significant amounts of a pollutant. Emissions from stationary sources that were not identified as point sources in this report have been included in the area source inventory. Examples of area source categories include agricultural operations, such as tillage, harvesting, and cotton ginning; offroad recreational vehicle use; construction activities; and windblown dust from disturbed soil areas.

Tillage – The use of mechanical operations such as discing, digging, ripping, overturning and land planing is generally referred to as tillage, which produces fugitive dust. Several methods are available to estimate tillage emissions. The first was used in the 2008 Periodic Emission Inventory PEI for Maricopa County. Tillage emissions were estimated using the tillage emission factor equation and Maricopa County specific soil silt content for agricultural land (URS and ERG, 2001). The agricultural tillage emission factor was calculated as follows:

$$EF = k\,(4.8)\,s^{0.6}$$

where:

EF = Agricultural emission tillage factor (lbs PM10/acre-pass)
k = Particle size multiplier (value of 0.15 for PM10)
s = Silt content of soil (%) = 35.2% (URS and ERG, 2001)

Thus: $EF = 0.15 \times 4.8 \times (35.2)0.6 = 6.10$ lbs PM10/acre-pass. This estimate does not take into account reductions for agricultural best management practices.

According to the 2008 PEI documentation, data on the majority of planted acres were obtained from the 2008 Arizona Agricultural Statistics Bulletin (AASS, 2009). Planted acres for potatoes and sorghum for grain were obtained from the USDA National Agricultural Statistics Service for 2008 (USDA, 2008b) and vegetables and citrus acreage were obtained from the 2007 Census of Agriculture (USDA, 2007a). Crop-specific annual land preparation operations data were obtained from the Technical Support Document for Quantification of Agricultural Best Management Practices (URS and ERG, 2001).

The key uncertainty in this emissions calculation is the estimate of activity that occurred on the design day. Since date-specific field operations data are extremely difficult to obtain, the approach used to estimate activity necessarily assumes that tilling operations can occur on any of the days during a crop's tilling season. This has the effect of producing an estimate of activity that, while statistically correct, significantly underestimates the level of activity on days when the activity occurs (i.e., since on many days no activity occurs). Thus, estimates developed using this methodology have the potential to significantly underestimate agricultural emissions when tilling occurs.

The second method uses tilling activity-specific emission factors from CARB[21] for Agricultural Land Preparation. Those values are summarized in Table 4-1.

Table 4-1
CARB Land Preparation Emission Factors Used to Prepare Agricultural Estimate of Agricultural Fugitive Dust Emissions

Land Preparation Operation	Emission Factor (lbs/acre pass)
Discing, Tilling, Chiseling	1.2
Ripping, Subsoiling	4.6
Land Planing & Floating	12.5
Forming/Planting[a]	0.8
Average	4.8

a. Discussions with CARB staff indicated that the weeding emission factor would be appropriate for this activity.

Additional information on plow-down speeds is needed to determine the acre passes per operation (e.g., disc implement width and speed can be used to determine the number of acres tilled per hour). The number of operations and the time of year in which they occur vary by crop type; therefore it is necessary to determine not only the acres of crop under cultivation, but the mix of crops being farmed on the selected design days.

MAG's 2007 Five Percent Plan[22] contrasted emission estimates using the two methods and found the above method produced an estimate of emissions for corn tillage that was an order of magnitude higher than produced by the first methodology. AERMOD performance evaluations determined that the lower values provided a better fit with concentration measurements. This indicates that care should be taken in determining which methodology to employ.

Data Sources – The following data are needed:

- Acreage under cultivation within modeling domains selected for low and high wind design days;
- The distribution of crops being cultivated within the selected modeling domains, either on average or within finer spatial domains; and
- The number of operations being conducted by crop type on the design days.

Information on the first two categories should be available from responsible government agencies, including the Arizona Department of Agriculture and USDA. The results

[21] *http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-4.pdf*
[22] Air Quality Modeling for the Salt River Area in Support of the Five Percent Plan for PM-10, prepared for Maricopa Association of Governments, by Sierra Research, November 2007

should be reviewed by the County Agricultural Agent to confirm their representativeness. Data on the number of operations are available only from farmers who were active on the design days. It is recommended that the results of the above analysis be shared with the local farm organizations to determine representativeness and to request additional information on activities that took place on selected design days.

Harvesting – The 2008 PEI used crop-specific emission factors (CARB, 2003) to estimate harvest emissions. Table 4-2 lists the crop types and associated PM10 emission factors used to calculate emissions from agricultural harvesting.

Table 4-2
CARB Harvest PM10 Emission Factors
(lb/acre-yr)

Crop Type	PM10 Emission Factor
Cotton	3.4
Wheat	5.8
Barley	5.8
Alfalfa Hay	0.0
Other Hay	1.68
Corn	1.68
Sorghum for Grain[a]	5.8
Potatoes	2.7
Vegetables[b]	0.08
Citrus	0.08

a. Assumed same emission factor, control efficiency, and number of harvest days per year as wheat and barley.
b. Includes melons, excludes potatoes.

Annual PM10 emissions from agricultural harvesting were calculated using the following equation:

Uncontrolled annual harvestCrop emissions = *EFcrop* × *ACrop* × ton / 2,000 lb

where:

harvestCrop = harvest emissions for each crop type (tons PM10/yr)
EFCrop = harvest emission factor (lbs PM10/acre)
ACrop = number of harvested acres for each crop type per year

Example:

EFCotton = 3.4 lbs PM10/acre for cotton
ACotton = 18,800 acres of cotton

Uncontrolled annual harvestCotton emissions =
3.4 lbs PM10/acre ×18,800 acres × 1 ton/2,000 lbs
= 31.96 tons PM10/yr

Key issues to be resolved in estimating harvest emissions are the control efficiency produced by applicable agricultural BMPs and whether fields located within the selected modeling domains were harvested on the selected design days.

Data Sources – Maricopa County obtained the majority of crop-specific harvest acreage from the 2008 Arizona Agricultural Statistics Bulletin. Harvest acres for potatoes were obtained from the USDA National Agricultural Statistics Service for 2008, and vegetables and citrus were obtained from the 2007 Census of Agriculture. These sources should be reviewed to determine if similar information is available for Pinal County. The data will be available only at a county level of disaggregation; if possible, more detailed data should be pursued to address the distribution of crops being cultivated within the selected modeling domains. It is suggested that the County Agricultural Agent be contacted to determine if a finer spatial resolution of cultivation is available.

Cotton Ginning – Annual emission reports are available from all permitted cotton gins in Pinal County. Daily emission levels can be calculated from facility-specific operating schedules. A review of the coordinates determined that seven cotton gins are located within the nonattainment area.

Data Sources – Each of the seven cotton gins should be contacted to determine their daily operating schedules.

Offroad Recreational Vehicle Fugitive Dust – EPA's NONROAD model estimates exhaust emissions for offroad recreational vehicles. Since particulate emissions are also generated by recreational vehicles traveling on unpaved surfaces, estimates of fleet size and activity are needed to support fugitive dust calculations. NONROAD provides estimates of annual mileage and number of vehicles by county for all-terrain vehicles (ATVs), offroad motorcycles (ORMs), and specialty vehicles/carts (SVCs). Daily estimates of travel can be calculated from the annual mileage and number of vehicles by category. These estimates of travel can be combined with emission factors for unpaved industrial roads, discussed in the section addressing fugitive dust from unpaved roads. The Maricopa County PEI assumed the average vehicle weight for offroad recreational vehicles was one half of a ton. ORMs (two wheeled vehicles) are assumed to emit at half the level of ATVs and SVCs (both four wheeled vehicles).

Data Sources – In addition to the variables required for estimating unpaved road fugitive dust emissions, estimates of vehicle activity in both the nonattainment area and within the modeling domains will be needed. Several options are available to allocate NONROAD estimates of vehicle class activity for the county to the nonattainment area and the individual modeling domains, including allocation by population, allocation by share of acreage, consideration of where offroad activity parks are located, etc. Contacts should be established with knowledgeable park and law enforcement officials to determine the best method for allocating activity.

Construction – Unlike most emission sources, the locations of construction activities and emissions move within modeling domains from year to year. Therefore, it is necessary to obtain information on dust control permits issued during the years of interest. Permits provide information on the project type, acreage, date issued, permit period (one year) and project location. Project types are listed below.

- Sand & Gravel
- Construction
- Unknown
- Commercial Construction
- Site Development
- Vacant
- Low Density Residential

To estimate emissions for each permit for the 2008 PEI, Maricopa County multiplied the number of acres by an emission factor that varied by project type (in units of tons/acre-month) by the number of months of construction duration, which also varied by project type.

Estimates for the duration of house and apartment construction were obtained from EIIP guidance (U.S. EPA, 2002). Estimates for the duration of nonresidential construction and road construction were obtained from the WRAP Fugitive Dust Handbook (WRAP, 2006a). No estimates for the duration of trenching, demolition, weed control, site prep/land development, and temporary storage yard activities were available; thus, the following activity periods are assumed, as previously cited in the MCAQD PEI:

- 1-month duration for trenching, demolition, and weed control;

- 8-month duration for site prep/land development activities (weighted average of residential and commercial duration) because the duration depends on the project type and size; and

- 12-month duration for temporary storage yard activities because these activities are frequently associated with road construction.

Emission estimates for residential (single-family and multi-family), nonresidential, road and general construction were obtained from the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook. Estimates for road construction were obtained from Clark County and general construction emission factors from the WRAP Handbook were used for trenching, demolition, weed control, and temporary storage yard activities. The average duration of construction activity and emission factors for each project type are shown below in Table 4-3.

Table 4-3 Average Project Duration and Emission Factor Employed in 2008 Maricopa County PEI		
Project Type	Duration (months)	Emission Factor (tons PM10/acre-month)
Residential: single-family	6	0.032
Residential: multi-family	12	0.11
Commercial	11	0.19
Road Construction	12	0.265
Trenching	1	0.11
Demolition	1	0.11
Trenching	1	0.11
Weed Control	1	0.11
Site prep/land development	8	0.11
Temp. Storage Yard	12	0.11

Two key assumptions employed in calculating emissions are described below.

- *Acreage* – No permits were included unless the area of disturbance was equal to or greater than an acre.

- *Dates* – The County estimates of project duration (e.g., road construction, 12 months; residential single family, 6 months; commercial, 11 months) were used to count backwards from the design date and determine if a permitted site would have been active on the design day. Thus, for example, any road construction project started more than 11 months prior to the day to be modeled was excluded from the inventory of sources that impacted that date.

Data Sources – Since the county issues permits for a 12-month period and many projects have durations that are shorter than 12 months, assumptions will need to be developed about when projects start so that it can be determined whether those projects are active on the selected design days. Similarly, assumptions about whether projects are active on weekends, holidays, etc. will also be needed. Discussions with Pinal County staff indicate that there are few multi-family projects, so a decision will be needed as to whether separate estimates of single- versus multi-family construction emissions are warranted. Similarly, estimates of the duration of the construction period on active days will also need to be developed (e.g., 10-hour days, 8-hour days, etc.), along with start and ending times.

<u>On-Road Mobile Sources</u> – On-road mobile sources are defined as those vehicles that are licensed for and operated on public roads (i.e., on highways, arterials, and other local

roads) and include cars, motorcycles, trucks, and buses. For the purpose of this IPP, on-road mobile sources consist of the following types of emissions:

- Exhaust, tire, and brake wear;
- Fugitive dust from vehicles operating on paved roads;
- Fugitive dust from vehicles operating on unpaved roads; and
- Fugitive dust from unpaved shoulders.

EPA's most recent motor vehicle emission factor model, MOVES (Motor Vehicle Emissions Simulator), is required to characterize emissions for the first category. AP-42, which is EPA's Compilation of Air Pollutant Emission Factors, provides specific methodologies for quantifying fugitive dust emissions for the second and third categories.

The general approach for computing on-road mobile source emissions consists of multiplying vehicle activity expressed as vehicle miles traveled (VMT) by vehicle emission factors (in units of grams/mile) obtained from the methods noted above. In large urban areas, VMT data are generally available at the roadway link level from travel demand model outputs. Outside urban areas, VMT is typically compiled at the county or regional level from sources such as the Highway Performance Monitoring System (HPMS) maintained by the Federal Highway Administration or fuel consumption and sales data (although use of fuel sales data at the county level can be problematic in regions of heavy inter-county travel). An outline of the methods, inputs required to characterize conditions within the nonattainment area and data sources for preparing inputs is outlined below.

Exhaust, Tire & Brake Wear – EPA's MOVES model requires the collection of local data to characterize the vehicle fleet operating in the nonattainment area. This is accomplished by preparing input fields to represent vehicle population, activity, road types, inspection and maintenance, fuel supply, and meteorology for the region and time period being simulated through MOVES. Each of the individual inputs once obtained must then be properly formatted and imported through the provided MOVES importer tools into a MYSQL database.

Described below are the inputs needed to represent the nonattainment area.

- <u>Vehicle Population</u> – The vehicle population field represents the regional fleet of vehicles for each of the 13 MOVES vehicle types; these data can typically be obtained from vehicle registration information. Using a VIN decoder software tool, the raw registration information can then be parsed into the appropriate MOVES vehicle type fields.

- <u>Age Distribution</u> – A separate input field that also relates to the vehicle population is the age distribution. Each of the 13 vehicle types in MOVES must also have the age of the vehicles defined; again, the vehicle registration information can be used as the source of that information.

- Alternative Vehicle Fuels and Technologies (AVFT) – The Alternative Vehicle Fuels and Technologies input defines the fraction of each vehicle type belonging to separate fuel and engine technology groups such as diesel, gasoline, natural gas and electric vehicles. VIN-decoded DMV data are one source for deriving these data.

- VMT by HPMS Vehicle Type – Annual Vehicle Miles Traveled organized by HPMS vehicle types are required inputs for the MOVES model. Where available the output from a travel demand model for a given region is used as the source of this information.

- VMT Fraction – In order to resolve the annual VMT by HPMS into finer temporal resolution three temporal breakdowns of VMT by each MOVES vehicle type are developed. These fields represent VMT fractions by month, day, and hour. At present, MOVES differentiates only between weekdays and weekends for daily VMT breakdowns. Traffic counter data are commonly used as the source of data for the VMT fraction fields.

- Road Type Distribution – Each of the vehicle types has VMT further resolved into the 5 distinct MOVES road types. A source for this data can be the outputs from a regional travel demand model.

- Ramp Fraction – The fraction of vehicle hours traveled on ramps is calculated using VHT data from a regional travel demand model. MOVES defines two distinct ramp categories: rural restricted and urban restricted roads.

- Speed Distribution – Average speed distribution can be calculated using VHT outputs from a regional travel demand model. Speed distributions are broken into 16 different bins in MOVES and distributed across vehicle type, road type, day, and hour.

- Inspection and Maintenance Programs – I/M data tables should reflect the vehicles in the region that are required to comply with the local I/M programs along with an estimate of the compliance fractions. The table is organized by pollutant process, state, county, vehicle types, fuel types, and model year.

- Fuel Data – The fuel supply and fuel formulation should be specified as MOVES inputs reflecting the local blend of fuels available. These inputs can be derived from local fuel inspection results where available. Additionally, MOVES does provide a default set of values that may be sufficient in the absence of local data.

- Meteorology – Average hourly temperature and relative humidity by month should be obtained from local meteorology stations and used in place of the MOVES default values.

Data Sources – Inputs for characterizing the vehicle fleet can be obtained from Arizona Department of Transportation (ADOT) registration files; fuels information can be obtained from the Arizona Department of Weights and Measures; I/M program data can be obtained from the Arizona Department of Environmental Quality (ADEQ); and vehicle activity data can be obtained from several sources, including ADOT, 2008 Highway Performance Monitoring System (HPMS) records (which can be obtained from ADOT), and MAG's travel demand model, which characterizes travel on portions of Pinal County. An alternate option for configuring MOVES to represent the nonattainment area is to use inputs developed by MAG to quantify Pinal County emissions for the ozone plan.

Fugitive Dust, Paved Roads – The AP-42 methodology computes paved road emissions as a function of silt loading values and the average weight of vehicles traveling on paved road surfaces. Maricopa County classifies roads as freeways, high-traffic arterials, and low-traffic arterials to reflect different silt loading assumptions. An arterial carrying a traffic volume of less than 10,000 vehicles per average weekday is classified as low-traffic; all other roads that are not freeways are classified as high-traffic arterials. The AP-42 equation for calculating paved road fugitive dust emission factors is as follows:

$$E = k \times sL0.91 \times W1.02 \times (1 - P/4N)$$

where: E = annual average particulate emission factor (g/mile),
k = particle size multiplier for particle size range (1.0 g/mile for PM10 and 0.25 g/mile for PM2.5),
sL = road surface silt loading (g/m^2),
W = average weight of the vehicles traveling on the roads (tons),
P = annual number of "wet" days with at least 0.254 mm (0.01 in) of precipitation, and
N = annual number of days (366 days in 2008).

Data Sources – Silt loadings are available from multiple sources. Maricopa County derived them from samples collected by an EPA contractor in 1993. The values, in grams per meter squared, derived from those samples are 0.02 for freeways, 0.067 for high-traffic arterials, and 0.23 for low-traffic arterials. Alternately, measurements can be obtained for selected roads from ADOT or those values can be augmented with measurements collected by ADEQ and/or Pinal County staff from a representative sample of roadways. Average vehicle weights can be derived from ADOT vehicle registration data for Pinal County.

Fugitive Dust, Unpaved Roads – The emission equations for calculating fugitive dust from unpaved road travel developed by EPA are published in AP-42.2. The equation used in this analysis is designed to estimate particulate matter emissions from light-duty vehicle travel on unpaved roads. This equation has the following form:

$$E = [(k)(s/12)^a(S/30)^d/(M/0.5)^c - C][(365 - P)/365]$$

where: E = particulate matter emission rate, pound per vehicle miles traveled (lb/VMT),
k = particulate size factor (dimensionless) = 1.8 for PM10,
s = surface material silt content (%),
S = mean vehicle speed, miles per hour (mph),
M = surface material moisture content (%),
a = empirical constant = 0.2 for PM10,
d = empirical constant = 0.5 for PM10,
C = PM10 emissions from vehicle exhaust, brake wear, and tire wear (lb/VMT), and
P = number of precipitation days per year on which 0.01 inches or more rain falls (days/yr).

Data Sources – The three variables in this equation—silt content, moisture content, and vehicle speed—vary significantly from one unpaved road to another. Because of this variability, measurements of these parameters are needed to increase the accuracy of the representation of roads within the nonattainment area. Options to collect these values include use of values employed by Maricopa County in the 2008 PEI (silt content, 11.9%; moisture content, 0.5%; and vehicle speed, 25 mph on unpaved roads and 10 mph on alleys). Another source of information on silt content and moisture content is an ADOT report entitled *Identification of Emissions Sources for Pinal County ADOT*, which provides values for five separate unpaved roads along with information on average vehicle speed and average daily traffic counts collected in 2005. This information was used to prepare separate PM emission factors for each of these roads. Lacking any other data sources, these values could be extrapolated to similar roads located within the nonattainment area and modeling domains. Alternately, ADEQ and/or Pinal County staff can collect measurements from a representative sample of roadways following AP-42 data collection and measurement procedures.

With regard to vehicle activity, PCAQCD collected daily counts of selected roads between October 2001 and August 2011. Counts were generally collected to respond to complaints and employed a single tube counter for a seven-day period. Road surface distinctions include dirt, dirt w/soil stabilizer, paved and dirt/gravel. Most of the roads counted were dirt roads. Some roads were sampled multiple times and could provide a basis from tracking trends in growth. A copy of the road counts is presented in Appendix H.

Fugitive Dust, Unpaved Shoulders – The 2006 field study in the Salt River Area of Maricopa County observed blowing dust emissions on unpaved arterial road and secondary road shoulders as a result of bow wake passage. Because emissions from this source can be controlled through programs that pave or stabilize shoulders and were found to be significant in the MAG PM SIP plans, they should be addressed in both the nonattainment area and modeling PM emissions inventories.

Although the literature reports very few truck bow wake emission studies, MAG used one good study from the San Joaquin Valley to estimate bow wake emissions in the Salt

River Area. The San Joaquin Valley study measured wind energy levels and particulate flux away from a paved road on which trucks were traveling at an average speed of 60 miles per hour.[23] The PM10 emission factor was computed to be 7.75 grams per vehicle kilometer traveled, or 12.47 g/mi. This emission factor cannot be directly applied to Pinal County traffic because of the lower truck speeds on arterial roads found in the nonattainment area.

Truck bow wake emissions were assumed in this study to vary with the square of the truck speed, very much as aerodynamic drag and bow wake energy vary with the square of vehicle speed. From the MAG travel demand model, Salt River Area truck speed was estimated to average 35 miles per hour. At this speed, the bow wake emission factor was computed to be 4.24 g/mi (= 12.47 g/mi x $\{35 \text{ mph}/65 \text{ mph}\}^2$) at 35 miles per hour.

MAG also computed windblown PM10 emissions from unpaved shoulders for modeling purposes. For this calculation, MAG used the "All Sites" wind erosion equation published in the 1986 Nickling and Gillies study.[24] Because the emission factor predicted by this equation is a function of the wind speed raised to the 4.355 power, it was concluded that the average hourly emission factor based on the average hourly wind speed would be less than the factor based on wind speeds measured during sub-hour increments. Because five-minute average wind speed data were available from MCAQD for the two monitors during the December 2006 field study period, a statistical analysis of this relationship found the use of five-minute wind data produced an hourly emission factor that was roughly 10% higher than the factor calculated on the basis of the hourly average wind speed. As a result, the statistical model developed from the December 2006 high wind data was used to adjust the Nickling and Gillies equation to account for this phenomenon. The adjusted equation was then used to compute the windblown emission factor for each high wind hour on the high wind design day.

Emission estimates require information on the fraction of travel generated by heavy trucks, and location and extent of unpaved shoulders within the nonattainment area and within the low wind modeling domains. Unpaved shoulder lengths can be multiplied by hourly truck counts to determine bow wake vehicle miles traveled for individual road segments. These estimates can be combined with g/mi bow wake emission factors to produce estimates of fugitive dust emissions.

Data Sources – Visual analysis of aerial photographs and Google Earth images can be used to determine the extent of unpaved shoulders on arterial and secondary roads within the nonattainment area and the modeling domains. Vehicle class count data will be needed for a representative sample of arterial and secondary roads within the nonattainment area and modeling domains. If not available, these data can be collected by either visual observation or through size-specific tube counts. Alternately, the values employed in the MAG analysis can be used.

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[23] "Effectiveness Demonstration of Fugitive Dust Control Measures on Public Unpaved Roads and Unpaved Shoulders on Paved Roads," prepared for the San Joaquin Valley Unified Air Pollution Control District by Desert Research Institute, 1996.

[24] "Evaluation of Aerosol Production Potential of Type Surfaces in Arizona," prepared for Engineering-Science by W.G. Nickling and J.A. Gillies, 1986.

Open Burning – Open burning is a waste disposal tool on central Pinal County lands used for agricultural production, residential occupancy, and commercial activities. Open burning is also used with less frequency to provide fire protection training, building demolition, and destruction of certain hazardous materials. Because of the very small quantity of daily or annual emissions generated by these latter uses, the open burning portion of the emission inventory will focus exclusively on the more frequent, higher emission activities that occur on agricultural, residential, and commercial property.

Data Sources – Emission factors for open burning by activity type will be derived from AP-42 and from research studies conducted in field experiments and burn chamber tests in the western United States over the past 30 years. Activity and location data for each open burning event in 2008 will be extracted from the open burning permit database maintained by PCAQCD.

4.2 High Wind Emissions

As discussed in Section 3, high wind sources typically consist of disturbed soil surfaces that require shielding from the wind, covering of soil surfaces, or the consolidation of wind-entrainable surface particles into wind-resistant matrices in order to reduce PM10 emissions. Control strategies for high wind sources are best developed from the analysis and modeling of design days during which only these sources are contributing to ambient PM10 concentrations. For the purpose of selecting high wind design days, high wind hours were defined as those exceeding a threshold velocity of 12 mph. Additional analyses may be warranted to determine a more precise wind speed threshold velocity for the purpose of determining high wind emissions.

At this point, ADEQ is considering two completely different methods for quantifying emissions under high wind conditions. The first back calculates emission factors for upwind lands by establishing a relationship between monitored concentrations and lands located within footprints determined to be impacting the monitors, based on an analysis of meteorological conditions for specific days and conditions; this method is summarized in a report entitled "A Method for the Back-Calculation of Wind-Blown Emission Factors from Field Measured PM_{10} Emissions," which is presented in Appendix I.

The second method replicates the approach MAG employed in quantifying high wind emissions for the Maricopa County's 2008 Periodic Emission Inventory (PEI) for PM10 and MAG's 2012 Five Percent Plan; a copy of MAG's methodology is presented in Appendix J. Effort will be required to adjust the methodology to represent conditions in the Pinal County nonattainment area (e.g., meteorology, land use, precipitation, silt content, soil texture, agricultural activity, etc.). Maricopa County's 2008 PEI cited local conditions that did not reconcile with the certain underlying wind tunnel studies, and relied upon a long-established low-wind inventory to justify a "standardization" to reduce the calculated annual windblown PM10 inventory. Prevailing conditions in Pinal County may not justify such "standardization" of wind-generated emissions. In general, activity rates and emission factors for a number of areally dispersed fugitive dust sources are

extremely difficult to quantify.[25] As such, EPA has requested that a modeling analysis be prepared to assess how well the two methods represent monitored concentrations.

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[25] Air Quality Criteria for Particulate Matter, Vol. 1, EPA/600/P-99/002aF, U.S. Environmental Protection Agency, October 2004

5. QUALITY ASSURANCE

This section presents a review of the QA procedures to be employed during the development of the emission inventories. It includes all of the critical elements recommended in the U.S. EPA documents cited in the Introduction, as well as guidance provided through the Emission Inventory Improvement Program (EIIP). It also provides written instructions for the technical and quality aspects associated with development of the new emission inventories. It is designed so that QA and quality control (QC) procedures are implemented throughout the entire inventory development process. This will ensure that the inventories are as complete, accurate, comparable, and representative as possible.

Inventory tasks and QC procedures will include data checking by the inventory development team (IDT) throughout the development of the inventory and final emission report. These procedures include, but are not limited to, the following:

- The development and implementation of written procedures for data collection, data assessment, data handling, calculation of emissions, and reporting;
- Adequate management and supervision of the work;
- Review of all calculations for technical soundness and accuracy, including verification that the appropriate emission factors were used and the impacts of controls were correctly addressed;
- Correct assignment of Source Category Codes;
- Assignment of DARS scores;
- Use of technically sound approaches when developing results based on engineering judgment;
- Documentation of the data in a manner that will allow reconstruction of all inventory development activities; and
- Maintenance of an orderly master file of all the data gathered and a copy-ready version of the final inventory submitted to the U.S. EPA.

The emission inventories developed in accordance with this plan are for SIP development and are considered Level II inventories, based on guidance provided by the 1996 EIIP. The estimates contained in the inventories will be used to make decisions about the need for and types of control strategies required to ensure short-term attainment and long-term compliance with the NAAQS. As a result, they must satisfy applicable QA requirements.

The first step in this process is establishing the data quality objectives (DQO) for the new inventories. Table 5-1 summarizes the procedures to be employed in meeting the DQOs, showing that considerable effort will be focused on meeting accuracy, completeness, representativeness, and comparability objectives.

Table 5-1
Data Quality Objectives

DQO	Procedure for Achieving Objective
Accuracy	For point and onroad mobile sources, the data generator will check 100% of the calculations, and another equally qualified inventory development team (IDT) member will check 20% of the calculations. For area and nonroad mobile sources, the data generator will check 100% of the calculations, and another equally qualified IDT member will check 10% of the calculations. In all cases, the data validator will develop a written summary of his or her activities, and will conduct follow-up activities to ensure that data are corrected as needed. If more than 5% of the calculations checked by the data validator need to be revised, then 100% of the calculations will be checked.
Completeness	Extensive planning will be conducted prior to data collection to identify all applicable emission sources. After identifying these sources, the goal will be to determine 100% of the emissions from the largest emitting sources from each source category and as many of the minor sources as possible within the time frame allotted for the work. Those sources identified but not included in the inventory will be identified in the data file and final report.
Representativeness	Technical personnel will review all of the primary source data and compare them to previous emission results and similar results from comparable regions to determine the reasonableness of the emissions estimates and representativeness of the data.
Comparability	To ensure that the data are comparable, standard procedures will be followed and results for the NAA will be presented in the same units that were used in the NEI inventories.

Table 5-2 shows the data quality indicators (DQIs) that will be used to measure progress towards the DQOs. The Data Attribute Rating System (DARS)[26] will be used to verify the desired inventory accuracy.

Table 5-2
Data Quality Indicators

DQO	Inventory DQI Target Values
Accuracy	Achieve DARS score >= 0.7 for all area sources contributing >10% of total emissions Achieve DARS score >=0.8 for all point sources >=100 tons per year (TPY) Achieve DARS score >=0.7 for onroad mobile source inventory Achieve DARS score <=0.5 for nonroad mobile source inventory.
Completeness	100% of all point sources >=100 tpy 90% of all other point sources
Representativeness	Monitor specific low and high wind source characterization
Comparability	Results for the NAA will be compared to NEI pollutant inventories.

5.1 Managerial Responsibilities

ADEQ will lead the preparation of the nonattainment area emission inventories. Key assignments shall include those outlined below.

State Inventory Coordinator – The State Inventory Coordinator will be responsible for planning and managing all inventory development activities, including the development of the QAP and the final emissions report.

Source Inventory Development Managers – Source Inventory Development Managers will be responsible for planning and leading source-specific inventory development activities.

QA/QC Coordinator – The QA/QC Coordinator will be responsible for ensuring that adequate QA/QC procedures are incorporated into the inventory development process. The Coordinator will conduct QA training and revise the audit schedule as needed so that all critical phases of the inventory development process are audited prior to generation of the emission report. The QA Coordinator will attend status meetings (by teleconference if necessary) held by the Inventory Development Managers and use the information from

[26] Beck, L.L., R.L Peer, L.A. Bravo, and Y. Yan, "A Data Attribute Rating System," presented at the Air & Waste Management Association Specialty Conference on Emission Inventory Issues, Raleigh, North Carolina, November 1994

these meetings to revise the audit schedule, when appropriate, to ensure that the audit objectives are met.

The QA Coordinator will categorize and use the audit findings to evaluate the effectiveness of QC measures and QA audits. The QA/QC program will be revised to address trends that suggest that the technical and data quality objectives are not being achieved.

The QA Coordinator's responsibilities and activities are as follows:

- Help develop the QAP;
- Develop the audit checklist and audit schedule;
- Provide QA training to inventory development and QA personnel;
- Attend inventory status meetings;
- Schedule audits, conduct audits, and report findings;
- Evaluate audit findings to determine if trends exist, and keep management informed of results;
- Follow up on recommendation for corrective actions;
- Keep the Inventory Development Manager informed of audit results;
- Work with the SIP Program Manager to resolve any quality concerns that cannot be resolved at the inventory management level; and
- Maintain a file of audit findings and corresponding corrective actions.

The QA Coordinator reports directly to the State Inventory Coordinator and indirectly to the managers overseeing the development of the inventory. These reporting lines help provide an objective approach to the implementation of the QA program and reporting of quality issues.

5.2 Schedule

The schedule includes the following tasks/completion dates:

- Data collection, including field measurements – January 31, 2013

- Inventory development, including source specific emission estimates and selection of high wind estimation method – March 29, 2013

5.3 General QA/QC Procedures

QA/QC procedures described in this QAP were developed to help ensure data accuracy, completeness, representativeness, and comparability. These procedures have been incorporated in the technical procedures, where applicable, and will be implemented by the IDT throughout the planning, data collection, emission estimation, and reporting phases of the inventory development program.

QC procedures will be implemented by the IDT during inventory development to meet the technical objectives and DQOs. These activities will be conducted at the following steps in the inventory development process:

- Data collection;
- Data documentation;
- Calculation of emissions;
- Data checking and DARS scoring;
- Reporting; and
- Maintenance of the master file.

Data collection will be conducted according to U.S. EPA-approved procedures. The approach and supporting documents or references will be thoroughly documented and included in the emissions report. The documents identified in Table 5-3 will be used to determine the best data-collection approach for each emission source type. Some data sources identified in these documents are also listed in Table 5-3. All data sources will be thoroughly documented by the IDT. The IDT will also document when required data needed for specific source categories cannot be obtained or do not apply. The reason for not including a source or source category in the inventory will be clearly explained in the documentation.

All activities conducted by the IDT will be documented. The traditional approach is to use bound notebooks with indices to facilitate the retrieval of recorded information. An alternate approach is to record activities electronically and make this information available to team members located in different parts of the state. To enhance communication and productivity, team members will be allowed to employ either approach but will be encouraged to track information relative to the development of the inventory electronically. This daily log of activities will help another IDT member reproduce the emission results and allow an evaluation of data accuracy and completeness.

Table 5-3 Data Collection Guidance Documents		
Source Type	Guidance Document	Suggested Data Sources
Point	EPA-450/4-91-016[a] AP-42[b] EIIP Volume II	Existing inventories, state permit files, facility surveys, county business directories, telephone directory
Area	EPA-45-/4-91-016[a] EIIP Volume III	Existing inventories, example cases and data sources
Nonroad Mobile	EPA-450/4-81-026d[c]	Existing inventories, example cases, and data sources
Onroad Mobile	EPA-45-/4-91-010[d] EPA-450/4-91-011[e] EIIP Volume IV	Transportation or planning agency data

a."Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I: General Guidance for Stationary Sources," U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 1991.
b. "Compilation of Air Pollutant Emission Factors, 5th Edition and Supplements, AP-42," U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina,1995.
c. "Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources," U.S. EPA, Office of Mobile Sources, Ann Arbor, Michigan, 1992.
d. "Emission Inventory Requirements for Ozone State Implementation Plans," U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 1991.
e. "Emission Inventory Requirements for Carbon Monoxide State Implementation Plans, U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 1992.

The following procedures are to be followed when documenting data in notebooks:

- Data will recorded legibly and in black ink;
- Entries will be corrected by drawing a single line through the data and writing the correct data above or below the correction (with initials, date, and explanation of corrections to allow reconstruction of the work);
- Complete descriptions of all data sources will be included (references to be included in final inventory report);
- Units of measurements will provided for emission sources that are omitted from the final inventory (justification required in report);
- The procedures used to calculate emission will be described and example calculations will be provided;
- The approach used to determine completeness for each source type will be described;

- Documents from which emission factors are taken will be identified and referenced; and

- The source, agency, group, or company providing information by telephone will be identified (include telephone number and date information was provided).

Worksheets and contact reports may also be used to maintain records of data sources or calculations; however, the same guidelines must be followed when recording information on them. A file will be developed specifically for these forms to ensure that they are retained and are easily located when the data are needed to calculate emissions. A contact report should include the date of contact; originator name, title, organization, and address of person contacted; and a summary. All worksheets, electronic spreadsheets, and notebooks will be reviewed periodically by the inventory development task leaders to determine whether the procedures described above are being followed. This review should be evidenced by a dated signature on the notebook pages or worksheets reviewed (i.e., reviewed by _____ on _____).

Data used in calculation emissions should be checked for data accuracy, reasonableness, and completeness. The results from data checking will be documented to further qualify the emission estimates. In addition to the DARS scores assigned, the number of data points checked assists reviewers in evaluating the accuracy of the completed emissions report. Documentation of DARS scoring and data checking should include descriptions of the rationale for scoring, the data checked, and the dated signature of the reviewer. An example area source form that will be used to document the data checked and the findings can be found in EIIP Volume VI, Chapter 5, Section 5, Figure 5.2.

QA activities are not directly involved in the development of the inventory. These include assessments of the effectiveness and appropriateness of the systems established by management to control data quality. This includes evaluations of the management and supervision of the work.

QA activities will include QA training and the conduct of a series of independent audits to assess the effectiveness of the QC system and management of inventory development activities. The QA coordinator and other trained personnel who are not involved in the inventory development process will conduct these activities.

Training/Education – Initial training sessions for the ADEC IDT will be conducted to discuss the items on the audit checklist and QA/QC requirements specified in this document. The QA Coordinator will conduct additional training when audits reveal the need for more QC measures or revision of existing procedures.

Occurrences that may lead to additional QA training include those listed below.

- An audit reveals a lack of understanding of QA/QC requirements or the need to develop additional QC measures.

- An audit reveals the need to provide guidance on acceptable data handling procedures because data are not maintained in a manner that allows easy verification of the accuracy of emission results and source of the supporting data.

- An audit reveals unacceptable data documentation practices that lead to entry errors or an inability to recreate emission results.

- An audit reveals that the internal data reviews do not adequately control data entry and calculation errors.

- The Inventory Development Manager requests QA training for new IDT member.

The QA coordinator will conduct the training and maintain records of each training session.

Audits – Audits will be conducted at key points in the inventory development process. These will include assessments as the inventory development process is being planned, during data collection, as emissions are being calculated, and when the results are reported. The primary goal of the audit program is to prevent quality concerns. Opportunities to incorporate preventative measures will be included during each audit.

Prior to announced audits, the auditor will inform the persons to be interviewed of the date and time of the audit and data systems to be reviewed. All of the personnel involved in inventory activities being audited will be asked to be available to respond to questions about their duties. The responses will then be compared to the requirements specified in this document and other referenced documents to determine compliance with approved procedures.

Questions that will be asked by the auditor and data to be evaluated during the audits vary by source type. The QA Coordinator will use the results of previous audits and work with the Inventory Development Manager to develop source-specific audit checklists. Example checklists for technical systems and data audits are provided in EIIP, Volume VI, Chapter 5, Appendices A, B, and C. After developing the checklists, QA training will be held to inform the IDT of the steps in the inventory development process that are considered to be of concern. These meetings will be used to increase the team's awareness of the points in the inventory development process that may require more QC and managerial oversight.

Data audits will be conducted after major data transcriptions and calculations. The auditor will evaluate consistency in data entry and manipulation between IDT members. The results from the audits will be immediately shared with the data generator and the Inventory Development Manager. IDT members involved in the audit will be asked to respond immediately to the findings that will be informally discussed after the audit.

Audit findings will be documented on the audit checklist. The audit checklist and notes will be used to summarize the preliminary findings for the IDT and Inventory Development Manager after the audit. The checklist and notes will also be used to

develop the audit report, which will be included in the QA documentation section in the inventory report.

The audit report will describe each deviation from approved procedures or finding that could compromise the successful outcome of the inventory. Documentation of each finding will include a description of the action or data reviewed that led to the quality concern and recommendation for corrective action.

At a minimum, the audit report will include the following:

- Name of auditor, Inventory Development Manager, and IDT members audited;
- Audit date;
- Audit type;
- Audit objectives;
- Audit findings; and
- Recommendations for corrective actions.

Audit reports will be distributed within two weeks of the completion of each audit to the persons interviewed and the Inventory Development Manager. A summary of the types of quality concerns found will be periodically forwarded to the Section Manager to keep her informed of the quality issues found and actions being taken to resolve them. Audit reports will be retained in a QA file and used to conduct subsequent audits and plan follow-up activities.

Recommendations for corrective actions will be presented in the audit report. Findings and actions implemented in response to each recommendation should be documented and included in the audit file on a response form. The response form should include the date, originator, problem identification, priority of problem, recommended action, problem resolution, and QA verification (a sample form is included in EIIP Volume VI, Chapter 5, Figure 2-3). The auditor will use the information on the response form to monitor the types of problems found and the phases of the inventory development process that may need additional QC to eliminate recurring quality concerns.

The urgency of the response is determined by the category of the finding, as listed below.

Priority 1: Potential for major revisions needed
Priority 2: Potential for failure to achieve DQOs
Priority 3: Suggested improvements.

Priority 1 and 2 will be immediately brought to the attention of upper management and the planned implementation dates for the corrective actions will be as soon as possible after the audit. The planned implementation date for Priority 3 findings may be later than the dates proposed for implementing actions taken in response to Priority 1 and 2 findings.

Follow-up activities will be conducted as frequently as required by the Inventory Development Manager and auditors to determine whether the recommended actions are taken. Each effort to assess the implementation of the corrective action will be documented and maintained by the QA Coordinator in an audit file established for these records.

Follow-up activities could include the conduct of additional audits or informal assessments of the data or system of concern. The type of reevaluation will be determined by considering the impact that the quality concern could have on the technical objectives and DQOs.

5.4 Data Reporting

Reporting will be accomplished by submitting written documentation and emissions summaries to the U.S. EPA. All supporting documentation, project notebooks, data sheets, and calculations shall be submitted for review.

The report will include summary tables, raw listings of equipment, activity levels and emissions from individual sources, and a QA documentation section. A detailed inventory report allows baseline inventories to be compared between one area and another and the impact of control strategies to be evaluated, and also facilitates updates to the inventory and development of projection inventories.

In addition to EIIP guidance, the U.S. EPA reports cited in the introduction will be followed. These documents provide guidance for presenting and documenting SIP emissions inventories, and contain examples of how to present and verify inventory development efforts. The QA documentation section of the emissions inventory will provide enough detail so that the inventory development described in the report can be compared to the information provided in this QAP. Any discrepancies will be identified and explained.

At a minimum, documentation should describe in general terms how the inventory data were collected and where they came from. Specific details for documentation requirements should be negotiated with the EPA regional office. The report will include the components listed below.

- A description of the geographic area included in the inventory, including documentation for any adjustments made to the original designated area. Documentation shall reference all sources of current or projected data, and include maps of boundaries for excluded areas.

- The base year of the emissions inventory.

- The population of the area, and the source of the population data.

- Efforts taken as part of QA program.

- Procedures used to temporally allocate each source category (e.g., selection of the months comprising the seasons, seasonal variations in activity levels at sources, daily variation in activity levels, etc.).

- Procedures used to spatially allocate the emissions inventory. If a dispersion model will be used for control strategy demonstrations, a map of the geographic area with the modeling domain and grid squares overlaid shall be included. The grid square sizes need to be indicated on the map.

The QA documentation section of the inventory report will also include the audit report. As discussed previously, the audit report will describe each deviation from approved procedures or findings that could compromise the successful outcome of the inventory. Documentation of each finding will include a description of the action or data reviewed that led to the quality concern, along with a recommendation for corrective action. The QA documentation section of the inventory report will then discuss how the recommended corrective actions were implemented.

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Appendix A

2008 24-Hour Average PM10 Concentrations Recorded at Six Pinal County TEOM Monitoring Sites

CASA GRANDE PM_{10} 2008 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	120.0	29.4	41.3	69.3	60.9	50.1	42.4	50.0	12.3	58.9	78.3	37.4
2	35.6	23.6	65.2	46.4	47.9	57.7	53.3	36.3	30.5	75.0	52.4	36.8
3	51.8	26.1	21.6	46.2	50.6	59.1	70.2	37.5	25.8	52.3	54.0	44.2
4	33.9	10.5	46.3	41.0	39.5	61.8	42.9	26.1	34.7	48.5	44.3	53.6
5	24.1	15.0	56.0	51.8	58.7	63.6	44.4	49.6	46.8	70.0	52.4	46.7
6	8.4	19.6	38.2	27.5	41.7	42.1	55.7	19.6	50.5	46.6	48.9	59.0
7	9.7	26.6	43.9	54.1	28.9	54.3	25.5	115.3	40.7	45.2	66.2	54.3
8	12.9	32.7	47.6	49.9	38.9	43.0	55.2	44.0	64.6	51.5	78.7	26.8
9	18.6	30.9	34.5	58.8	65.3	52.3	27.4	27.8	32.1	48.8	**182.9**	24.8
10	25.8	28.9	38.6	62.8	57.1	53.7	25.1	31.9	25.4	55.7	85.2	25.3
11	31.4	39.5	51.8	46.4	58.5	44.0	24.2	38.6	**202.5**	99.5	55.1	55.1
12	23.1	39.5	53.9	39.8	53.6	39.5	17.9	42.9	49.0	46.4	43.4	53.6
13	16.7	32.3	20.8	38.7	46.8	66.7	17.1	43.4	32.4	51.1	61.5	64.3
14	13.9	37.6	61.4	56.1	37.1	71.8	23.5	23.7	35.9	57.2	70.1	36.5
15	49.5	13.3	47.0	47.3	62.4	61.8	29.2	31.2	49.0	58.0	103.7	25.3
16	34.5	10.6	25.5	64.1	26.1	71.2	31.9	51.1	**AN**	40.7	39.9	9.9
17	24.7	16.2	16.2	38.2	28.7	57.4	39.4	24.6	**AN**	53.3	61.1	11.4
18	41.5	22.5	35.8	55.4	29.7	74.3	38.7	29.1	53.8	52.8	58.3	9.4
19	37.7	28.4	43.2	62.6	57.3	53.0	59.0	29.3	56.3	45.4	94.8	23.4
20	40.4	30.1	47.0	29.2	47.9	65.5	10.7	28.8	35.7	53.6	96.3	21.0
21	30.8	33.2	54.9	40.4	**164.2**	67.5	23.4	34.7	25.4	55.3	113.2	22.5
22	39.2	23.7	50.6	59.4	78.8	103.2	31.6	34.6	44.9	62.0	94.8	22.7
23	42.6	19.4	42.1	75.6	29.4	75.6	27.9	72.2	50.3	77.2	86.8	14.5
24	22.0	20.8	53.3	62.1	26.2	57.3	46.2	40.0	56.4	98.6	77.3	18.9
25	36.3	39.9	55.7	58.6	17.0	63.5	43.9	39.5	44.1	86.6	136.9	11.4
26	32.6	34.3	48.2	66.4	14.6	34.3	20.1	16.4	49.3	74.7	49.7	9.4
27	13.4	26.7	49.7	74.7	27.2	24.5	21.5	24.2	31.5	125.7	7.8	13.3
28	11.9	48.3	49.9	55.7	27.6	34.9	28.4	18.2	31.1	49.5	16.7	16.2
29	27.4	51.9	37.6	62.6	30.6	49.2	28.9	24.3	48.0	74.3	16.3	26.3
30	23.7		51.3	55.4	40.5	37.2	30.9	23.0	47.0	89.5	19.0	30.6
31	13.1		51.0		39.4		54.8	10.6		78.0		60.0

1st quarter average	34.5	2nd quarter average	51.9	3rd quarter average	39.1	4th quarter average	54.3
# of valid samples	91	# of valid samples	91	# of valid samples	90	# of valid samples	92
% of samples collected	100.0%	% of samples collected	100.0%	% of samples collected	97.8%	% of samples collected	100.0%
# of 24 hr exceedances	0	# of 24 hr exceedances	1	# of 24 hr exceedances	1	# of 24 hr exceedances	1

COMBS PM_{10} 2008 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	39.6	53.6	40.9	69.7	67.5	49.8	73.4	89.8	17.4	91.1	69.2	24.0
2	68.5	25.8	31.7	85.4	59.4	60.5	60.7	49.2	29.5	106.2	44.2	26.6
3	66.7	31.1	77.4	62.7	50.1	66.5	74.1	48.8	54.7	78.1	66.6	33.7
4	39.3	8.9	58.0	65.5	40.1	79.6	51.2	54.3	63.0	61.8	64.3	34.8
5	29.4	10.6	58.4	63.4	76.5	98.6	40.0	107.6	62.9	76.5	67.5	44.9
6	8.4	17.8	42.1	37.6	65.0	70.6	67.2	27.9	52.7	71.7	61.3	32.5
7	9.9	26.1	68.2	55.2	65.1	56.5	41.7	85.4	35.0	78.3	61.9	30.4
8	15.9	39.7	35.4	77.5	82.5	62.4	42.9	74.4	94.7	92.5	64.6	22.7
9	18.8	43.5	28.1	75.8	86.4	73.3	44.5	26.2	55.4	61.2	270.0	27.8
10	27.7	29.4	70.3	68.7	83.1	63.6	23.6	27.9	79.5	97.7	105.0	39.3
11	32.6	38.1	63.7	54.4	62.4	46.4	18.5	60.5	194.7	88.0	45.2	52.2
12	28.7	48.8	54.3	46.1	84.2	85.3	17.1	92.2	75.3	51.7	44.1	73.3
13	16.0	86.6	60.3	48.0	62.7	92.4	20.2	97.5	71.2	56.3	70.7	59.6
14	54.6	57.6	79.4	80.0	47.2	65.0	25.6	32.1	39.9	65.2	53.6	39.3
15	60.1	12.4	55.4	79.7	121.1	51.6	42.8	35.9	101.9	70.4	89.9	31.3
16	52.2	7.5	28.3	93.4	56.9	84.0	54.4	34.9	75.2	69.9	40.8	14.4
17	54.2	12.1	32.6	53.5	42.9	81.8	54.9	33.1	76.6	81.1	77.7	11.0
18	57.5	26.3	61.9	81.9	45.2	73.1	59.4	41.5	70.4	62.4	65.9	13.1
19	33.5	40.2	72.9	64.8	59.0	77.7	81.6	54.0	87.3	44.8	75.1	17.8
20	27.9	28.6	76.0	44.0	52.5	97.9	12.7	61.8	41.1	79.0	65.6	17.7
21	41.6	21.8	75.6	65.5	170.7	85.8	30.4	51.3	28.2	86.1	92.2	14.2
22	70.2	27.6	40.1	78.6	72.6	75.9	32.8	77.4	67.0	68.6	63.7	16.5
23	81.4	17.6	43.3	83.5	19.6	73.0	43.4	55.6	70.8	71.1	56.2	13.7
24	49.2	18.0	90.7	72.1	24.5	70.9	48.4	41.1	109.5	82.4	80.0	17.1
25	37.0	36.0	101.4	69.4	19.9	101.0	59.0	67.9	148.2	90.6	113.9	8.5
26	37.7	55.8	94.5	53.5	16.6	54.8	40.9	13.4	59.9	68.7	38.8	8.2
27	12.4	50.0	73.4	93.0	28.8	37.3	36.0	14.4	52.9	121.5	7.3	11.0
28	6.7	60.2	87.8	87.8	34.3	40.9	69.4	23.6	45.5	93.1	10.8	12.1
29	27.3	74.3	51.4	73.2	43.9	61.9	74.0	24.2	192.1	87.2	14.1	24.3
30	16.1		57.7	84.3	54.2	47.1	81.0	33.9	104.5	93.3	16.0	21.1
31	40.5		80.5		52.7		66.1	15.0		101.9		28.4

1st quarter average	44.6	2nd quarter average	65.9	3rd quarter average	57.6	4th quarter average	57.2
# of valid samples	91	# of valid samples	91	# of valid samples	92	# of valid samples	92
% of samples collected	100.00%	% of samples collected	100.00%	% of samples collected	100.00%	% of samples collected	100.00%
# of 24 hr exceedances	0	# of 24 hr exceedances	1	# of 24 hr exceedances	2	# of 24 hr exceedances	1

CWTN 1400 PM_{10} 2008 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	67.7	35.2	111.3	239.0	239.0	133.7	200.3	169.6	26.4	299.8	192.5	42.1
2	86.4	34.5	135.5	230.4	327.4	240.1	172.2	126.1	87.6	286.1	147.5	38.1
3	110.1	30.8	50.9	354.8	306.3	264.2	211.3	137.4	100.5	271.4	219.8	54.1
4	51.3	20.3	167.7	436.1	303.5	216.1	91.3	99.9	126.0	237.7	146.8	63.0
5	44.2	15.7	114.9	240.7	243.5	280.9	88.7	306.4	163.2	188.8	148.9	63.4
6	10.9	15.0	106.4	216.7	303.8	169.4	155.6	56.1	149.3	255.7	207.1	98.6
7	22.8	AN	182.6	323.7	199.7	174.2	77.3	336.4	174.0	153.9	283.7	62.1
8	14.5	AN	106.1	419.9	225.6	226.5	217.9	47.0	172.8	275.6	313.1	45.1
9	19.1	AN	127.8	276.9	272.1	226.0	131.9	41.9	64.2	204.6	527.8	44.2
10	22.5	AN	183.3	301.5	344.1	289.3	104.6	61.9	43.0	177.2	156.0	59.4
11	27.6	68.7	294.2	389.4	352.7	195.7	21.3	76.1	63.7	326.1	177.8	83.4
12	31.4	68.1	159.8	369.6	304.4	228.5	19.9	106.3	70.4	188.3	196.0	91.8
13	23.8	65.2	437.9	163.9	180.4	313.4	49.4	114.7	83.8	168.1	216.1	58.6
14	13.9	123.6	310.3	337.6	200.9	262.7	23.8	70.5	160.9	263.1	264.8	65.2
15	58.4	30.2	224.5	326.4	265.1	217.5	54.8	63.2	83.1	210.1	125.7	59.3
16	47.9	11.9	93.3	376.0	268.7	198.3	98.6	73.7	AN	191.8	45.7	38.8
17	31.8	13.5	206.8	327.4	363.8	195.4	100.3	82.0	AN	344.6	268.5	9.5
18	80.0	28.9	334.1	361.6	290.0	306.3	110.2	102.0	AN	207.6	209.4	21.4
19	63.9	37.8	123.3	306.1	224.1	363.8	128.0	185.0	216.8	218.1	400.5	21.8
20	61.4	75.3	228.7	162.8	375.2	367.8	25.4	199.3	133.7	223.7	345.0	18.4
21	50.7	48.0	539.3	266.6	608.6	250.9	51.9	237.1	173.9	256.3	174.5	19.9
22	88.7	27.6	406.0	213.6	167.8	293.5	64.6	126.4	262.8	172.0	379.7	18.7
23	59.3	55.3	237.7	226.5	27.9	249.4	92.0	239.6	136.4	337.2	268.7	18.9
24	35.5	AN	372.6	336.6	24.8	326.3	149.6	106.6	166.3	273.4	273.5	13.4
25	23.0	AN	496.8	404.6	21.3	196.9	147.3	142.8	75.4	288.2	274.5	9.8
26	57.6	58.4	335.7	246.2	30.8	114.2	21.3	69.4	218.6	367.6	85.9	19.9
27	20.8	54.8	252.9	168.3	58.8	143.8	47.3	53.6	155.9	279.7	13.1	14.9
28	11.4	79.4	273.7	238.0	77.0	165.4	83.4	31.5	104.4	247.9	18.2	17.7
29	26.5	64.0	225.3	334.6	84.8	135.3	121.0	29.1	210.1	188.8	19.1	20.0
30	33.0		267.9	285.0	113.5	242.5	105.5	37.5	241.2	244.5	17.6	43.7
31	14.1		134.7		117.2		143.5	17.0		176.7		54.6

1st quarter average	113.1	2nd quarter average	250.5	3rd quarter average	116.0	4th quarter average	162.3
# of valid samples	85	# of valid samples	91	# of valid samples	89	# of valid samples	92
% of samples collected	93.4%	% of samples collected	100.0%	% of samples collected	96.7%	% of samples collected	100.0%
# of 24 hr exceedances	21	# of 24 hr exceedances	78	# of 24 hr exceedances	24	# of 24 hr exceedances	50

MARICOPA PM_{10} 2008 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	20.0	37.2	42.8	63.9	56.8	45.2	106.1	67.7	16.9	73.9	89.5	45.9
2	134.7	37.4	91.5	62.4	42.2	69.4	87.8	49.3	28.2	98.2	70.9	46.8
3	42.6	24.2	25.3	39.5	59.7	58.0	65.3	37.6	34.5	104.7	88.4	47.4
4	55.3	14.9	50.8	58.8	58.5	103.5	54.2	42.0	41.1	76.8	50.7	65.2
5	29.9	33.3	44.7	85.9	93.9	136.3	34.0	92.7	56.8	82.0	61.6	52.1
6	12.4	27.5	35.2	43.0	54.0	58.6	61.4	29.4	61.0	67.4	65.4	65.5
7	12.7	41.7	42.1	59.7	40.4	71.4	60.9	213.3	57.2	63.9	65.0	62.7
8	17.5	53.4	60.0	70.3	65.2	49.2	108.8	51.4	78.8	79.0	85.8	29.7
9	27.5	39.1	28.8	72.7	114.2	81.9	80.3	26.8	37.5	75.6	520.3	29.3
10	34.4	30.6	56.0	63.0	79.1	71.3	65.4	31.6	30.8	68.7	82.5	31.9
11	42.3	42.4	64.0	48.3	62.0	54.8	15.8	36.2	170.4	157.0	67.2	53.3
12	33.4	51.6	70.2	50.2	104.6	65.1	21.0	50.8	60.6	30.3	77.9	66.8
13	19.5	50.2	72.3	45.2	74.4	78.2	45.9	46.1	21.7	40.8	90.9	61.5
14	16.9	73.1	78.2	56.8	104.8	60.8	23.3	36.4	37.8	38.9	106.5	38.7
15	41.2	19.8	53.3	73.3	94.3	54.1	35.0	35.1	59.2	91.1	58.6	53.6
16	39.6	11.8	30.7	81.7	41.1	67.3	38.3	34.3	31.3	79.6	41.8	16.2
17	25.2	20.3	25.5	48.6	62.6	63.6	50.6	28.3	42.0	100.7	91.4	15.5
18	47.4	29.9	52.0	96.8	52.6	86.6	AN	32.4	61.2	79.3	110.7	25.3
19	34.9	34.1	74.3	75.6	74.3	63.8	AN	38.5	AN	61.3	116.5	37.5
20	35.6	34.7	61.9	38.8	84.2	76.6	AN	45.9	52.8	69.5	125.8	23.4
21	38.2	29.7	69.0	68.2	317.1	87.5	AN	46.8	43.1	73.1	153.2	21.7
22	53.2	27.4	55.3	81.1	86.5	123.1	42.2	49.1	71.7	61.6	93.8	26.5
23	47.7	20.8	46.3	72.5	27.8	106.5	53.7	51.7	63.8	65.4	108.3	21.0
24	36.9	24.6	65.8	61.3	26.0	108.2	61.3	43.1	87.4	136.6	81.1	18.5
25	23.8	39.2	91.2	47.8	18.8	98.6	70.9	99.2	59.3	113.9	129.6	10.5
26	32.9	37.3	63.9	62.5	20.0	68.5	21.1	21.1	67.5	84.0	62.8	14.3
27	15.2	33.6	68.7	54.5	34.3	43.3	23.3	38.2	55.3	159.4	9.6	17.4
28	16.5	51.5	76.4	73.6	34.4	47.5	32.1	AN	31.2	72.6	14.7	16.2
29	37.7	63.3	63.8	95.7	29.2	56.0	50.2	AN	75.8	106.5	18.1	23.3
30	30.7		91.2	75.4	49.8	80.0	52.4	27.2	51.4	103.2	22.5	32.8
31	20.1		39.9		43.4		64.1	13.6		114.0		33.7

1st quarter average	42.9	2nd quarter average	68.9	3rd quarter average	52.1	4th quarter average	70.6
# of valid samples	91	# of valid samples	91	# of valid samples	85	# of valid samples	92
% of samples collected	100.00%	% of samples collected	100.00%	% of samples collected	92.39%	% of samples collected	100.00%
# of 24 hr exceedances	0	# of 24 hr exceedances	1	# of 24 hr exceedances	2	# of 24 hr exceedances	3

PINAL COUNTY HOUSING PM_{10} 2008 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	264.9	29.6	50.6	76.9	62.8	64.7	159.2	76.5	16.0	79.5	122.1	36.9
2	71.8	23.9	51.5	62.4	67.0	58.5	64.6	69.6	32.4	118.3	77.2	41.9
3	53.9	34.7	36.4	57.3	106.5	63.6	106.2	32.7	47.7	85.6	72.9	45.2
4	32.1	8.6	55.4	69.9	60.6	99.3	67.1	39.6	50.7	144.6	57.6	100.5
5	33.4	7.5	61.7	72.0	63.3	64.7	61.9	59.8	80.7	81.1	93.7	68.3
6	9.0	12.3	75.9	36.3	113.3	93.9	75.8	22.0	65.2	93.7	120.6	66.7
7	9.4	36.4	65.8	64.1	47.6	79.4	22.8	60.5	53.8	101.4	96.5	54.1
8	7.8	19.4	64.0	70.3	68.4	71.0	55.1	69.3	129.9	95.4	122.3	BJ
9	11.8	24.7	54.7	71.4	88.6	80.7	33.4	31.0	68.1	70.4	285.2	BJ
10	15.2	27.6	51.9	59.6	130.8	65.6	23.4	38.2	33.6	71.9	81.2	46.6
11	23.3	29.7	63.9	64.9	AN	62.2	22.4	50.4	217.1	97.5	47.3	77.9
12	18.1	32.6	56.7	116.5	AN	76.8	17.4	60.1	55.9	50.1	50.3	93.2
13	18.3	27.1	60.3	65.5	AN	100.4	24.0	58.7	40.1	85.9	86.4	141.0
14	17.1	50.6	66.1	77.2	52.4	110.2	27.2	25.4	70.3	88.5	83.5	30.8
15	23.5	12.3	54.8	64.9	221.1	64.0	37.3	204.1	92.3	78.3	81.3	20.3
16	38.4	8.1	37.5	78.8	36.9	75.5	55.3	89.1	46.7	90.8	47.7	14.7
17	44.0	12.1	29.7	67.7	AN	80.0	77.9	22.2	64.4	81.2	81.5	11.3
18	60.1	18.1	45.5	102.7	AN	105.6	61.0	42.0	80.0	62.5	79.5	10.1
19	43.7	24.4	83.1	102.3	AN	88.0	77.9	43.5	87.3	60.7	130.3	22.4
20	42.0	19.6	75.9	46.9	64.0	110.9	12.9	54.3	61.0	79.5	160.6	22.2
21	46.9	34.1	73.5	67.4	273.8	86.4	24.7	66.3	31.7	78.2	98.8	31.1
22	68.0	18.5	78.3	73.8	98.7	141.6	49.4	66.8	60.7	94.5	116.3	29.5
23	58.7	24.5	72.4	83.0	24.4	89.7	46.5	67.7	59.1	106.2	94.4	13.3
24	27.4	25.1	69.9	83.8	25.6	73.9	54.1	57.1	57.0	117.7	84.4	13.7
25	37.6	50.4	107.5	94.8	18.6	103.3	71.2	45.9	65.5	89.7	AN	36.3
26	53.0	42.1	80.2	75.1	17.6	71.0	27.5	15.1	56.4	85.3	AN	30.9
27	14.3	38.4	63.7	127.7	33.1	33.6	29.1	23.6	66.4	153.3	9.3	11.5
28	5.8	44.1	95.6	83.7	33.8	55.3	52.2	19.7	47.9	78.6	13.4	15.0
29	20.1	63.2	49.2	72.4	44.9	68.3	74.8	16.6	68.3	178.0	28.2	22.5
30	16.7		80.1	106.0	51.8	64.2	59.8	22.6	86.9	140.7	19.8	33.3
31	14.0		66.8		49.6		96.9	37.6		159.1		40.1

1st quarter average	43.7	2nd quarter average	77.1	3rd quarter average	57.1	4th quarter average	75.2
# of valid samples	91	# of valid samples	85	# of valid samples	92	# of valid samples	88
% of samples collected	100.00%	% of samples collected	93.41%	% of samples collected	100.00%	% of samples collected	95.65%
# of 24 hr exceedances	1	# of 24 hr exceedances	2	# of 24 hr exceedances	3	# of 24 hr exceedances	4

STANFIELD PM_{10} 2008 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	255.3	24.2	52.3	57.4	57.3	52.6	127.5	74.8	20.8	96.6	137.8	34.1
2	61.8	23.8	141.9	50.3	72.2	71.6	116.4	60.9	33.1	105.8	64.8	46.0
3	58.9	45.2	49.3	67.5	106.3	79.5	157.8	54.5	34.3	56.2	70.2	49.5
4	40.0	14.5	45.3	55.2	43.0	114.4	43.4	52.5	48.8	74.0	63.0	51.8
5	21.5	12.3	44.7	75.9	125.2	76.2	57.0	115.3	43.9	76.1	83.0	50.0
6	10.1	19.7	49.6	44.9	43.2	59.4	44.3	35.2	59.1	118.3	108.6	70.0
7	10.6	22.7	58.5	76.0	43.4	69.7	67.1	364.3	65.2	105.3	112.5	52.8
8	10.0	34.7	54.4	46.3	81.8	54.5	86.6	58.3	264.2	86.3	82.5	18.3
9	9.7	31.6	62.4	66.6	79.7	111.4	41.8	31.2	36.5	49.6	375.1	24.5
10	13.8	26.3	66.8	104.9	161.7	60.6	29.5	40.7	31.4	98.6	92.3	31.0
11	22.2	33.0	60.3	68.9	56.9	54.4	24.4	67.7	178.2	103.6	57.8	62.7
12	21.3	38.0	75.2	144.2	83.9	102.3	20.4	90.7	55.1	83.0	99.3	70.9
13	20.4	40.9	49.1	152.9	89.0	115.0	44.2	53.4	42.0	104.7	73.3	178.2
14	36.5	57.3	74.0	97.1	56.2	146.6	29.5	37.4	51.8	94.5	89.7	46.7
15	39.3	18.4	69.9	58.2	89.6	134.3	26.5	33.8	65.4	119.6	240.7	41.7
16	30.4	10.2	25.3	95.3	65.7	107.7	36.4	63.3	35.9	115.1	75.8	69.9
17	29.7	14.9	18.6	49.6	55.2	89.1	49.2	32.0	36.1	131.6	141.9	8.8
18	40.0	18.2	49.0	82.1	46.9	83.7	52.0	46.8	75.3	91.2	153.7	8.5
19	40.5	28.8	56.8	88.3	115.4	84.2	101.2	42.1	52.8	67.2	117.0	16.1
20	30.4	24.7	65.7	49.0	61.6	126.8	13.6	41.1	47.8	107.5	123.9	16.9
21	27.5	28.2	64.6	AN	323.0	106.3	24.5	54.7	25.6	94.1	178.6	16.2
22	51.3	17.4	83.5	100.4	134.1	149.3	41.9	71.2	56.3	91.5	138.6	17.6
23	42.7	18.5	153.0	141.4	25.2	103.2	60.2	100.7	73.7	AV	102.1	11.9
24	19.7	26.2	112.5	67.8	24.4	79.4	145.5	99.8	74.6	AV	116.2	16.9
25	22.9	38.0	94.1	145.3	19.2	105.9	67.4	49.0	64.7	125.7	149.8	26.7
26	33.0	48.1	57.3	207.5	18.8	52.2	24.2	23.8	65.8	86.2	55.4	6.5
27	14.5	44.2	57.8	125.4	30.3	47.1	28.6	58.0	64.4	212.6	7.4	9.3
28	10.1	60.0	62.2	92.6	30.3	73.9	49.4	14.5	56.5	87.8	8.8	11.9
29	22.7	60.5	66.6	63.1	36.9	78.7	57.2	18.9	79.8	162.1	19.3	18.3
30	28.5		60.3	89.1	53.4	70.9	78.2	34.6	122.2	131.3	20.8	26.8
31	14.0		71.2		75.1		70.5	10.9		121.0		31.0

1st quarter average	44.2	2nd quarter average	83.7	3rd quarter average	62.1	4th quarter average	81.1
# of valid samples	91	# of valid samples	90	# of valid samples	92	# of valid samples	90
% of samples collected	100.00%	% of samples collected	98.90%	% of samples collected	100.00%	% of samples collected	97.83%
# of 24 hr exceedances	1	# of 24 hr exceedances	3	# of 24 hr exceedances	4	# of 24 hr exceedances	6

Corresponding Color Codings		AQS Codings
24 hour exceedances	any sample > 154.5 ug/m^3	
PCAQCD Exceptional Event	HIGH WIND EVENTS	
	HIGH WIND EVENTS - EPA CONCURRED.	###[A]
Noise excedences	when the noise on the monitor is greater than 1.0 for more than 1 hour	AN
Status flow out of range	flow out of range for more than 1 hour	AH
	status codes other than 0 for more than 1 hour	AN
General maintenance	monitor is down for general maintenance activities or filter exchanges for more than 1 hour	BA
Negative data readings	data readings > - 10.4 ug/m^3 or	AI
	Operator Error for more than 1 hour	BJ
Power failures	power outage for more than 1 hour	AV
CAL / VER / AUDIT	monitor is down to perform monthly verification or	AT
	annual system calibrations or	AT
	bi-weekly flow verification or	AX
	QC Audit (ADEQ) for more than 1 hour	AZ

Appendix B

Plots of Hourly PM10 Concentration, Wind Speed, Wind Direction, and Mixing Height Recorded or Modeled at Cowtown, Pinal County Housing, and Stanfield Monitoring Sites on October 29, 2008

STAGNATION DAY, 10/29/2008, COWTOWN

Figure B1. PM10 vs. Wind Speed

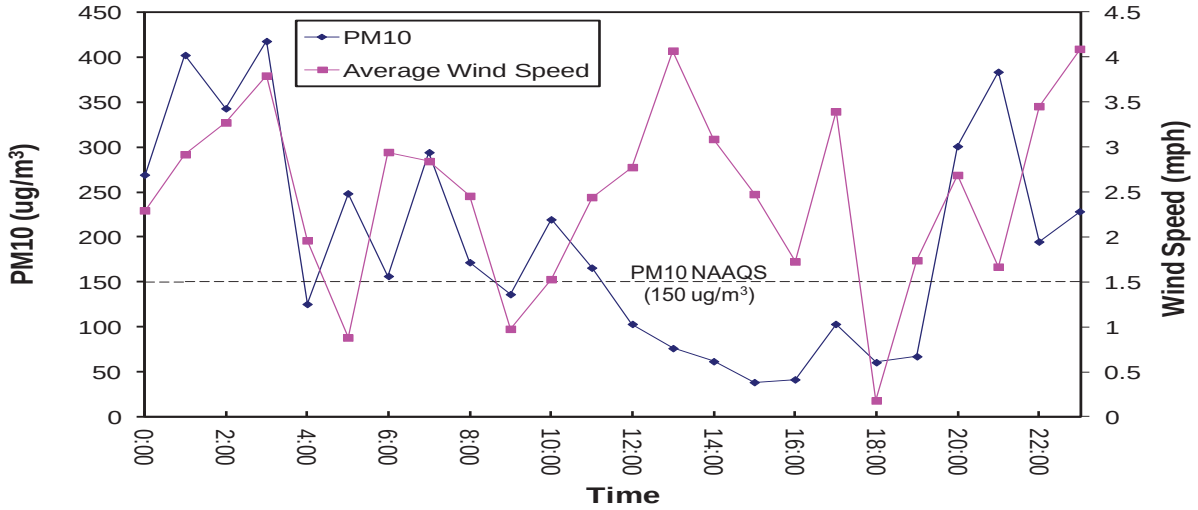


Figure B2. Wind Direction vs. Wind Speed

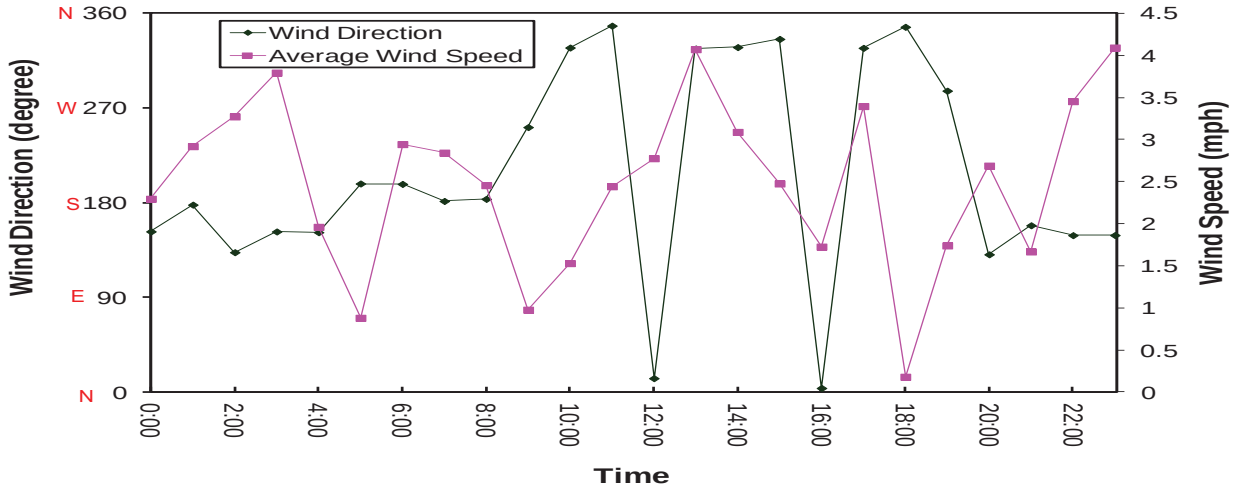
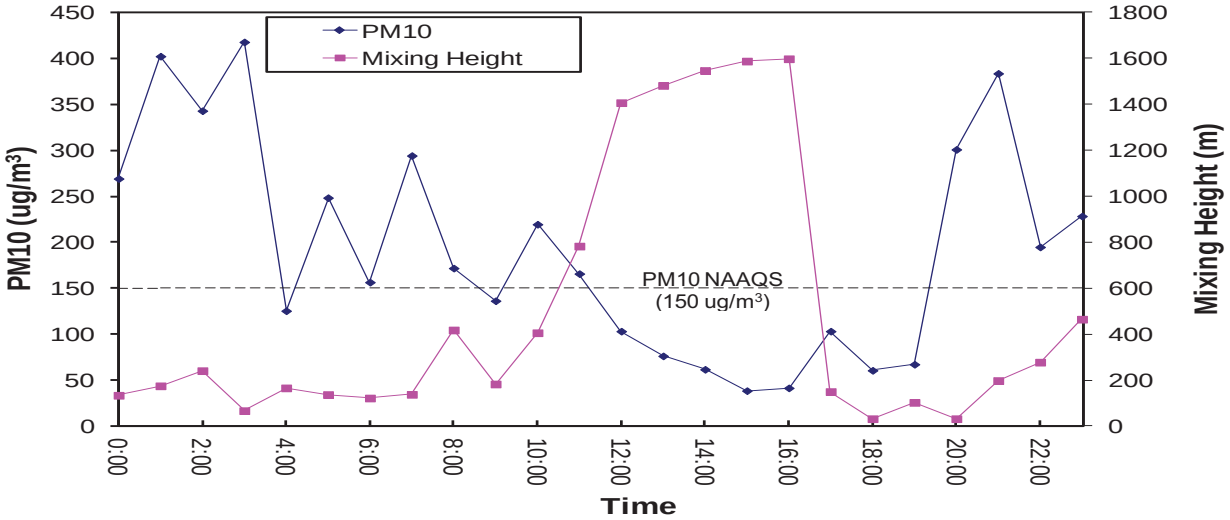


Figure B3. PM10 vs. Mixing Height



STAGNATION DAY, 10/29/2008, PINAL COUNTY HOUSING

Figure B4. PM10 vs. Wind Speed

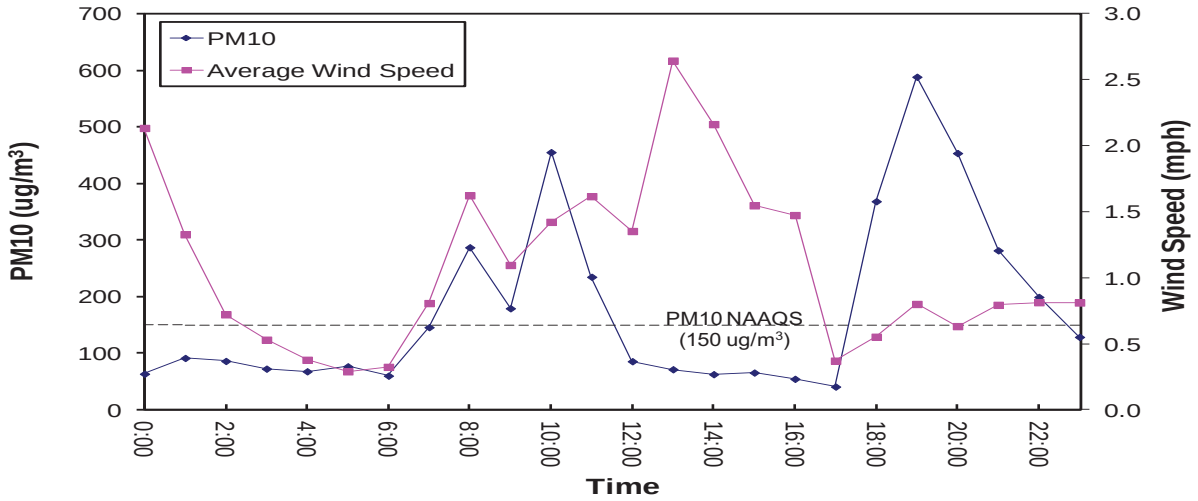


Figure B5. Wind Direction vs. Wind Speed

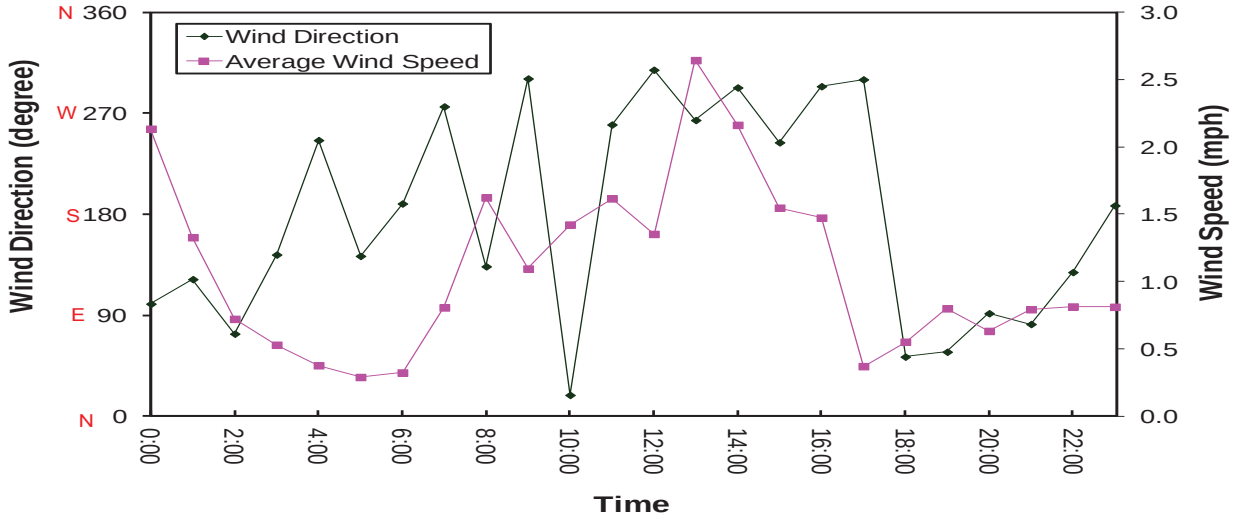
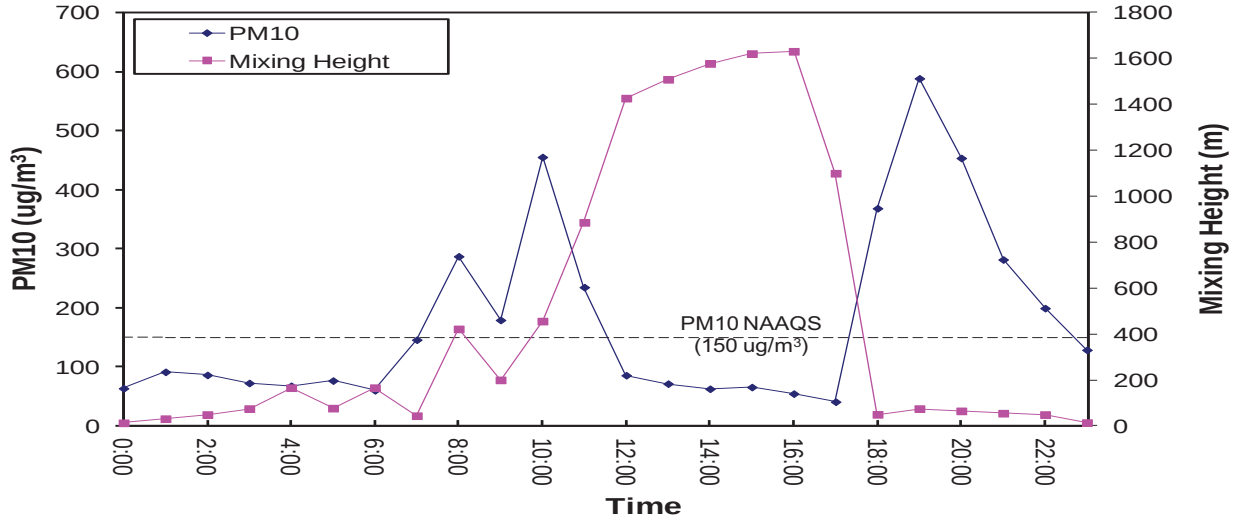


Figure B6. PM10 vs. Mixing Height



STAGNATION DAY, 10/29/2008, STANFIELD

Figure B7. PM10 vs. Wind Speed

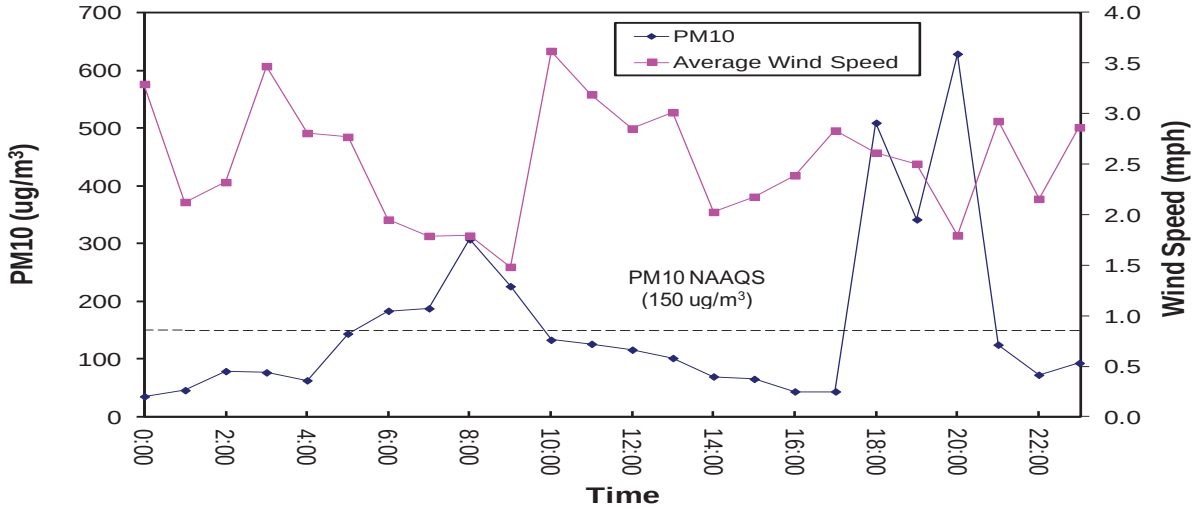


Figure B8. Wind Direction vs. Wind Speed

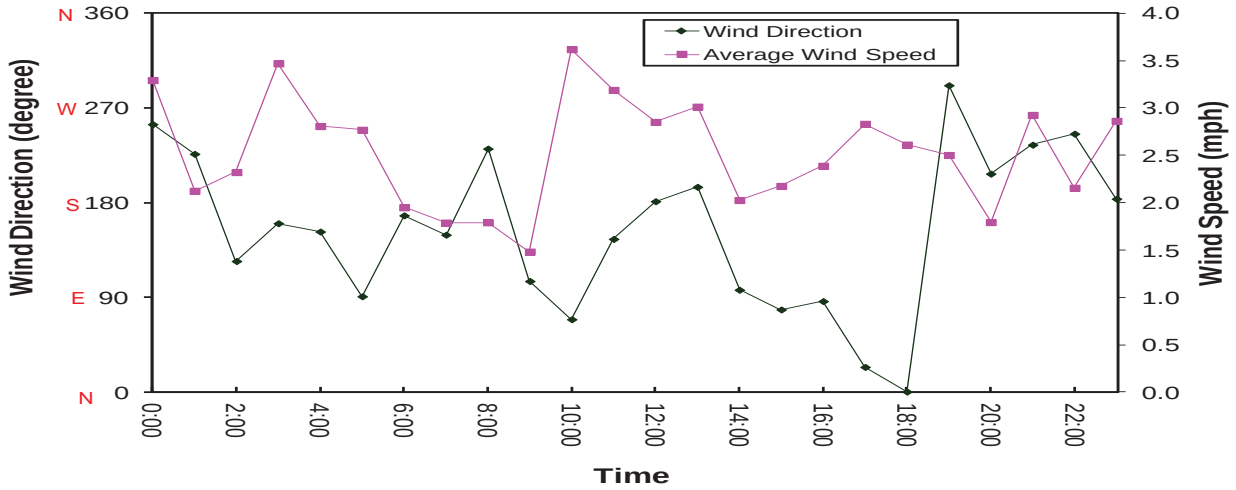
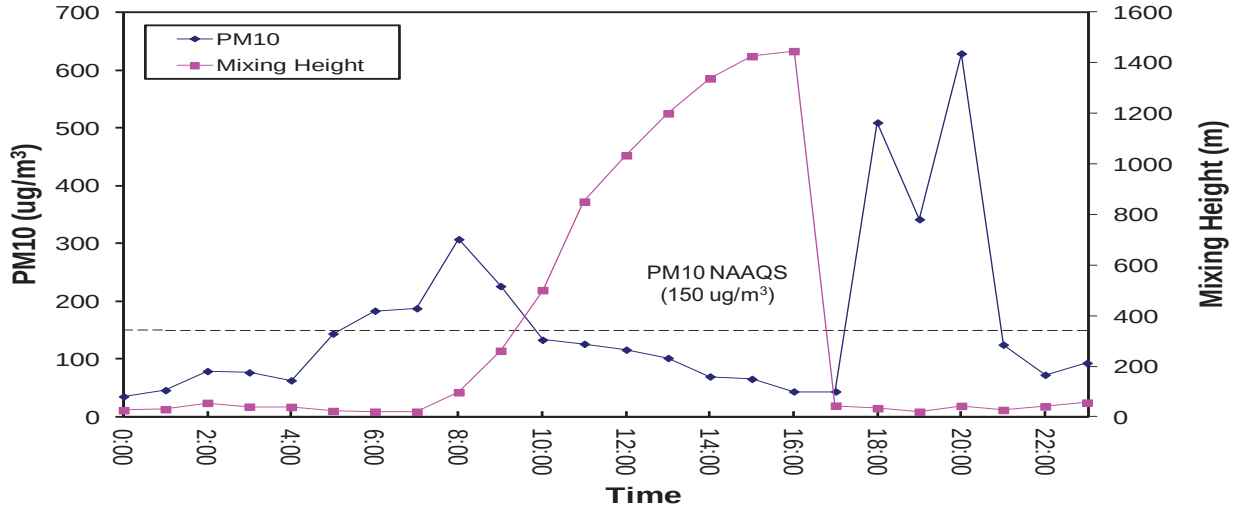


Figure B9. PM10 vs. Mixing Height



Appendix C

Statistics of the High Wind PM10 Exceedance Days at Cowtown in 2008

Table C1. Statistics of the PM10 High Wind Exceedance Days at Cowtown in 2008

Date	Number of High Wind Hours	Daily Average PM10 (ug/m^3)	Daily Average WSPD (mph)	Daily Max WSPD (mph)	Correlation of Hourly Wind Speed and PM10	Number of High Wind Non-feedlot Hours
5/21/2008	12	609	11	19	0.643	0
11/9/2008	10	528	12	22	0.540	0
4/8/2008	1	385	6	12	-0.118	0
4/16/2008	4	376	4	16	0.432	0
4/15/2008	2	326	7	14	-0.464	0
8/7/2008	3	336	6	22	0.498	0
10/11/2008	12	326	11	18	0.462	0
3/14/2008	5	310	8	13	-0.237	0
6/18/2008	2	306	6	13	-0.326	0
8/5/2008	1	306	5	16	0.384	1
5/6/2008	3	304	7	16	-0.034	0
5/12/2008	3	304	8	15	0.236	0
10/27/2008	9	280	10	20	-0.076	9
5/9/2008	1	272	7	13	-0.300	0
4/30/2008	6	285	10	18	0.110	0
4/9/2008	1	277	8	12	-0.401	0
5/15/2008	1	265	5	19	0.250	1
3/30/2008	2	268	7	15	0.309	0
5/16/2008	3	269	7	14	-0.427	3
10/4/2008	2	238	7	14	-0.098	0
5/5/2008	6	243	9	16	0.012	0
10/28/2008	3	248	6	17	-0.470	3
4/5/2008	2	241	7	13	-0.353	0
6/30/2008	1	242	5	13	-0.288	1
4/2/2008	2	230	6	13	0.217	0
6/4/2008	8	216	10	17	0.476	0
5/1/2008	4	219	8	14	-0.122	0
9/29/2008	5	210	8	18	-0.010	5
7/1/2008	2	200	6	15	0.125	2
7/8/2008	2	200	5	13	0.321	1
5/13/2008	2	180	8	17	-0.112	1
5/22/2008	4	168	9	14	0.577	0
10/10/2008	4	177	9	15	0.096	0
4/27/2008	7	168	7	16	0.191	7
11/21/2008	8	160	8	19	0.127	6
4/13/2008	2	164	5	13	0.038	2

HIGH WIND DAY, 04/27/2008, COWTOWN

Figure C1. PM10 vs. Wind Speed

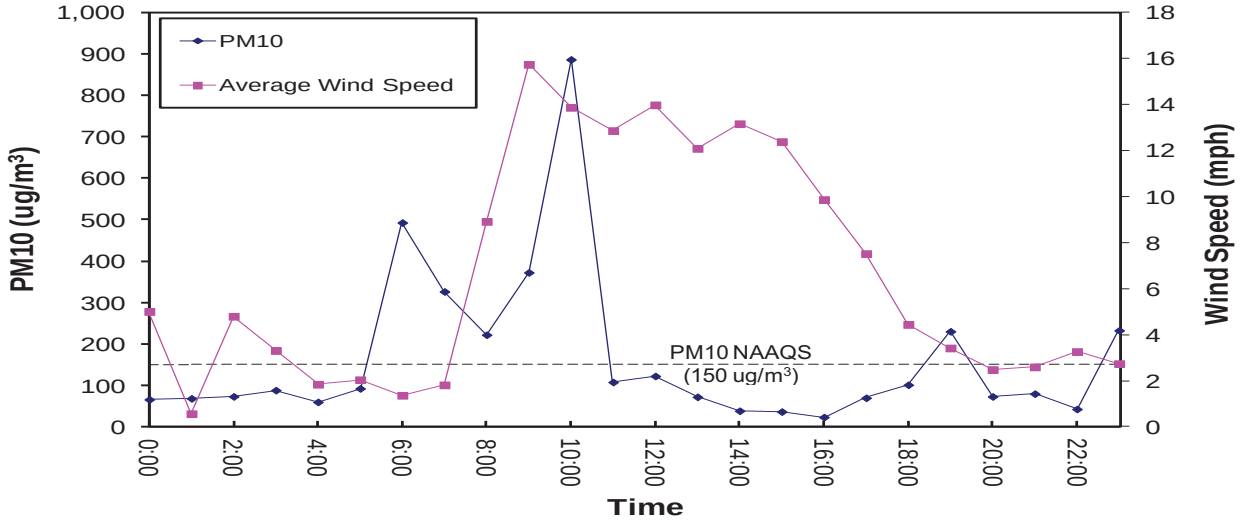


Figure C2. Wind Direction vs. Wind Speed

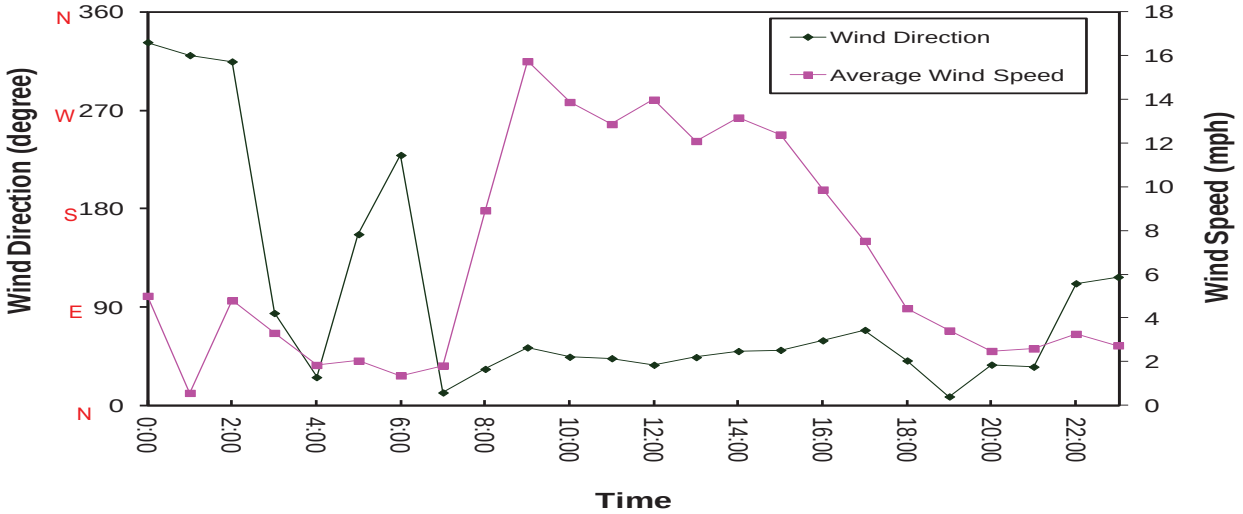
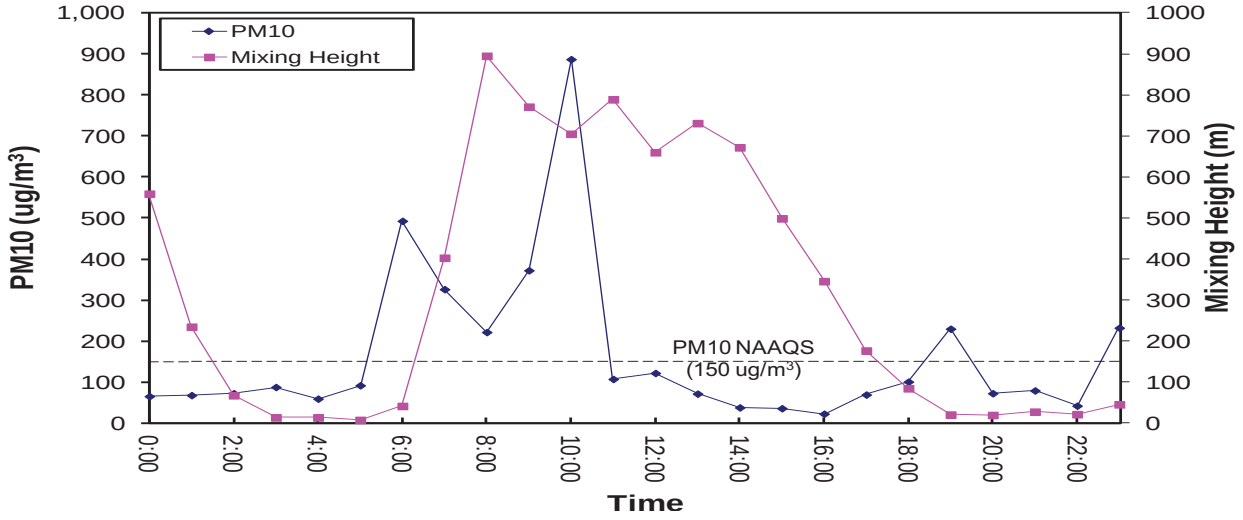


Figure C3. PM10 vs. Mixing Height



Appendix D

Statistics of the High Wind PM10 Exceedance Days at Stanfield in 2008

Table D1. Statistics of the PM10 High Wind Exceedance Days at Stanfield in 2008

Date	Number of High wind hours	Daily Average PM10 (ug/m^3)	Daily Average WSPD (mph)	Daily Max WSPD (mph)	Correlation of Hourly Wind Speed and PM10
11/9/2008	7	371	9	22	0.7494
8/7/2008	3	365	6	21	0.6961
5/21/2008	15	317	14	21	0.8545
1/1/2008	11	255	10	21	0.5550
11/15/2008	7	244	8	18	0.5942
10/27/2008	5	211	7	16	0.4814
11/21/2008	7	178	7	16	0.6289
9/11/2008	2	177	6	27	0.8111
12/13/2008	7	177	8	15	0.6429
7/3/2008	1	159	5	12	0.5470
4/13/2008	3	158	6	18	0.3838

HIGH WIND DAY, 05/21/2008, STANFIELD

Figure D1. PM10 vs. Wind Speed

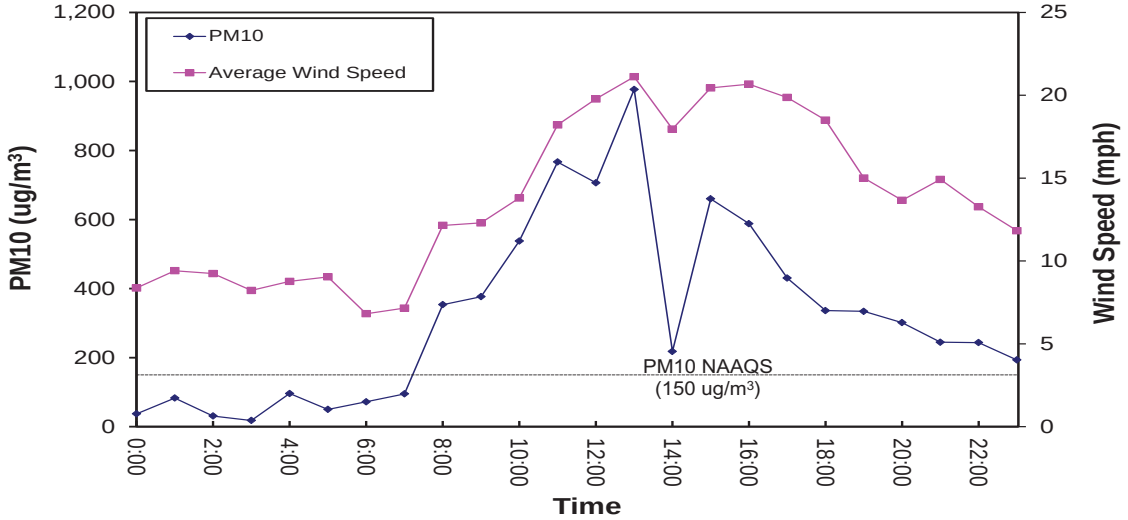


Figure D2. Wind Direction vs. Wind Speed

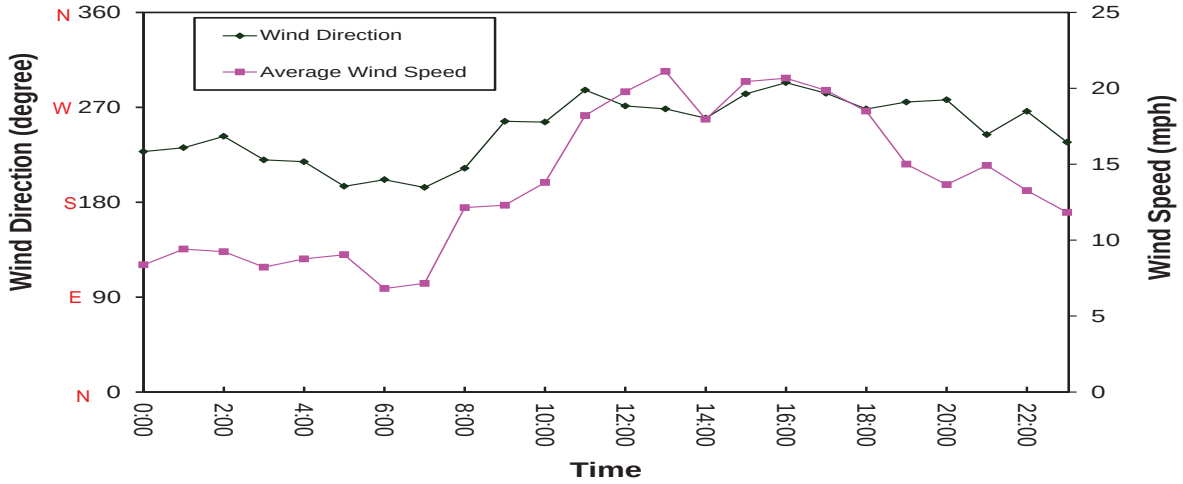
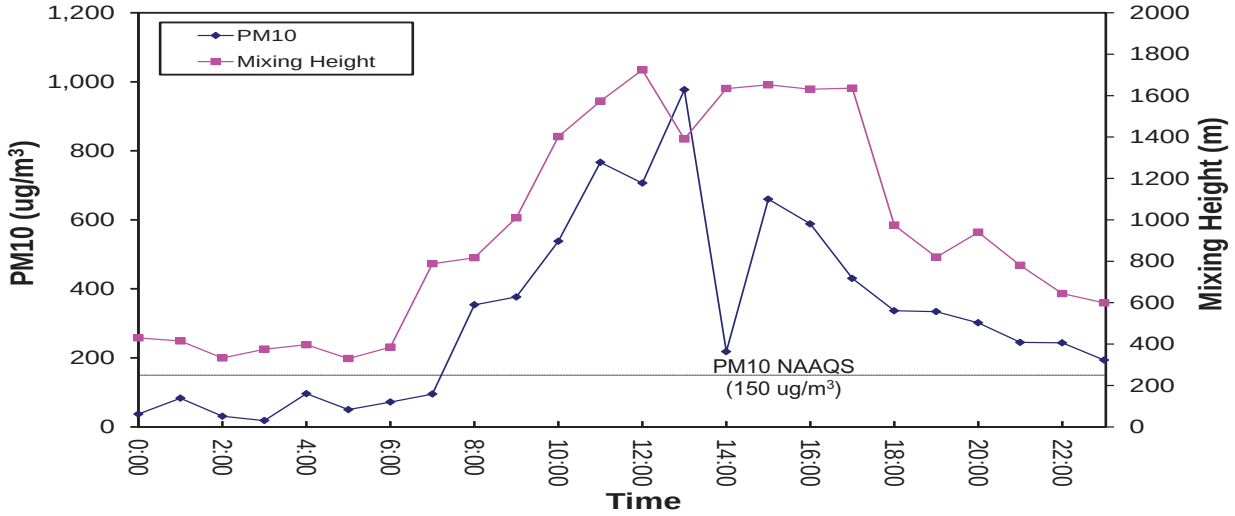


Figure D3. PM10 vs. Mixing Height



HIGH WIND DAY, 11/09/2008, STANFIELD

Figure D4. PM10 vs. Wind Speed

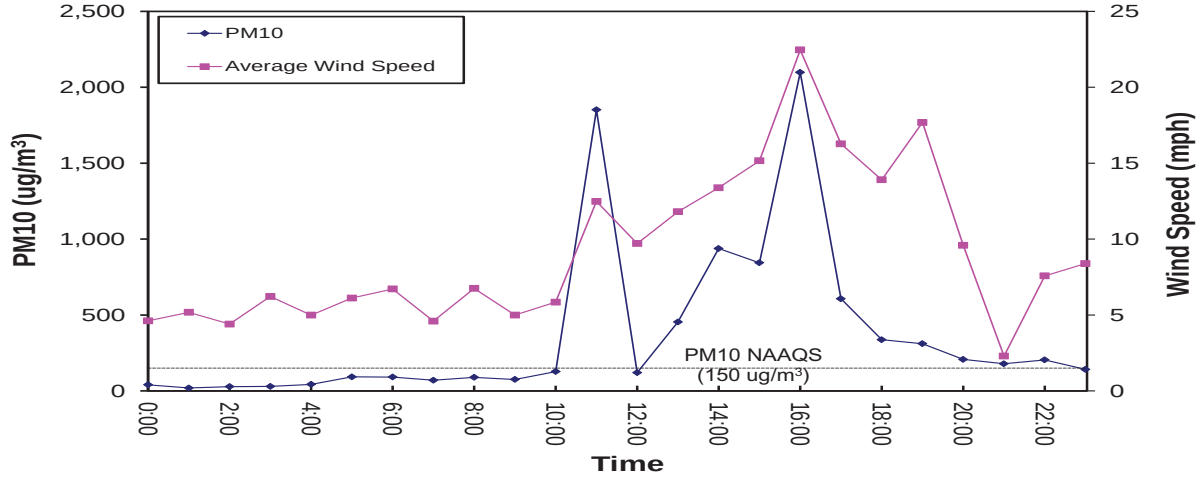


Figure D5. Wind Direction vs. Wind Speed

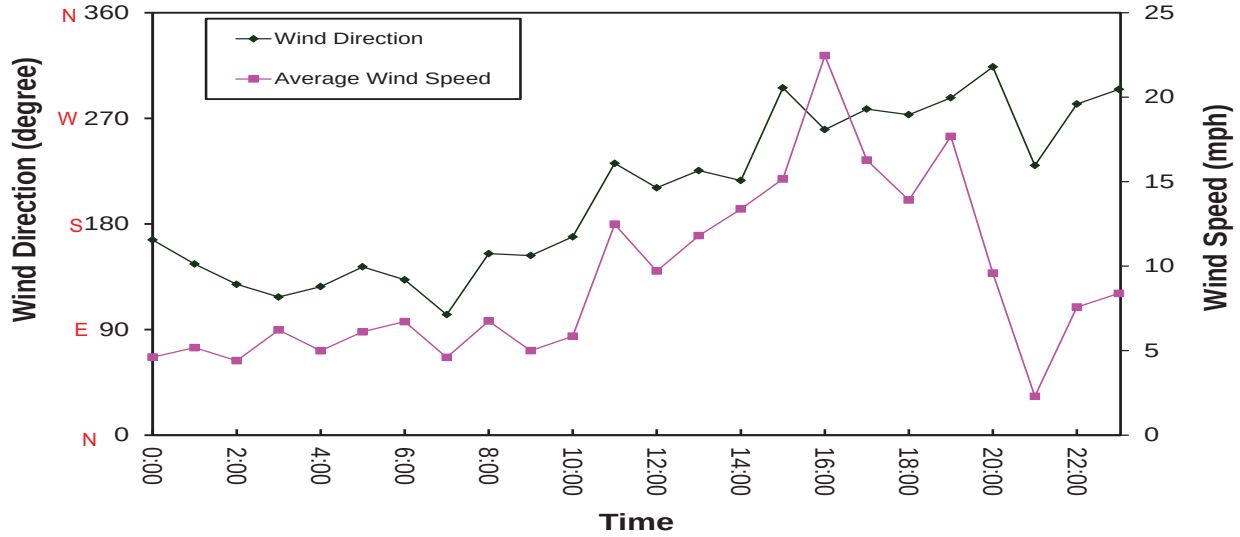
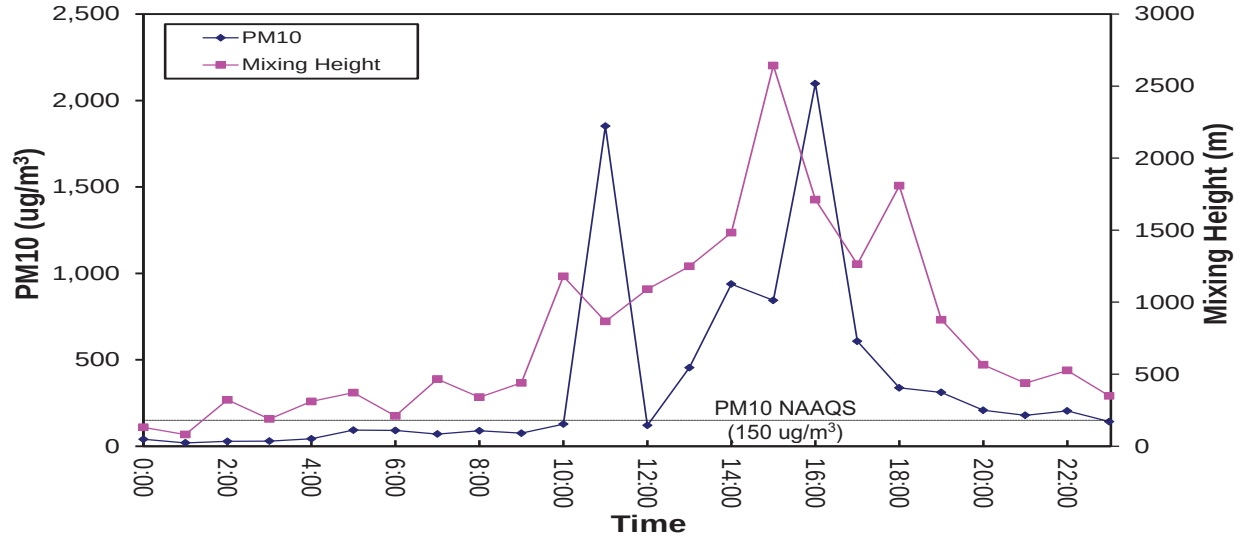


Figure D6. PM10 vs. Mixing Height



HIGH WIND DAY, 12/13/2008, STANFIELD

Figure D7. PM10 vs. Wind Speed

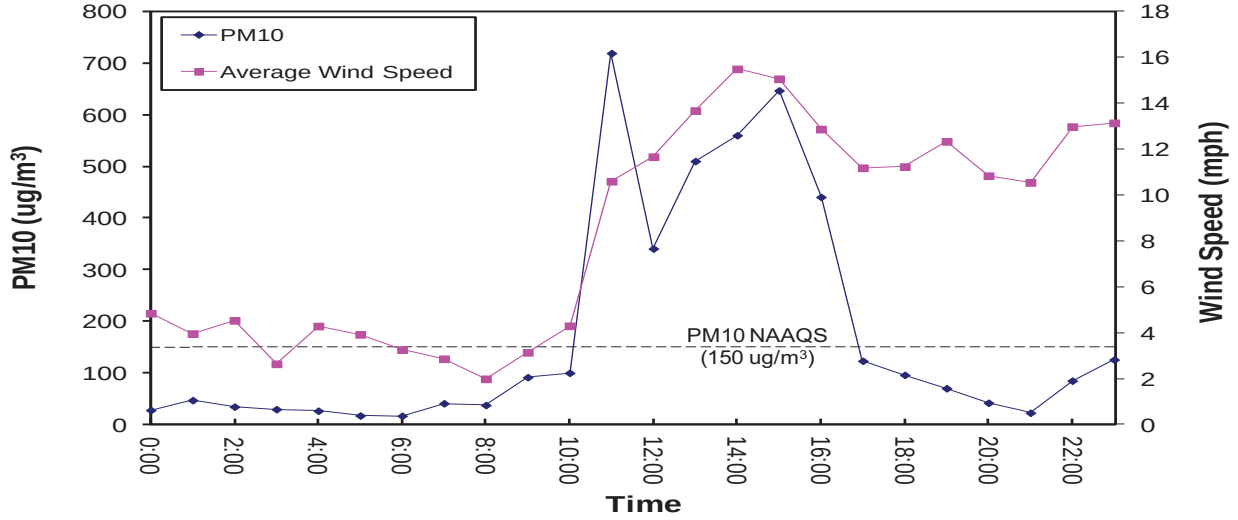


Figure D8. Wind Direction vs. Wind Speed

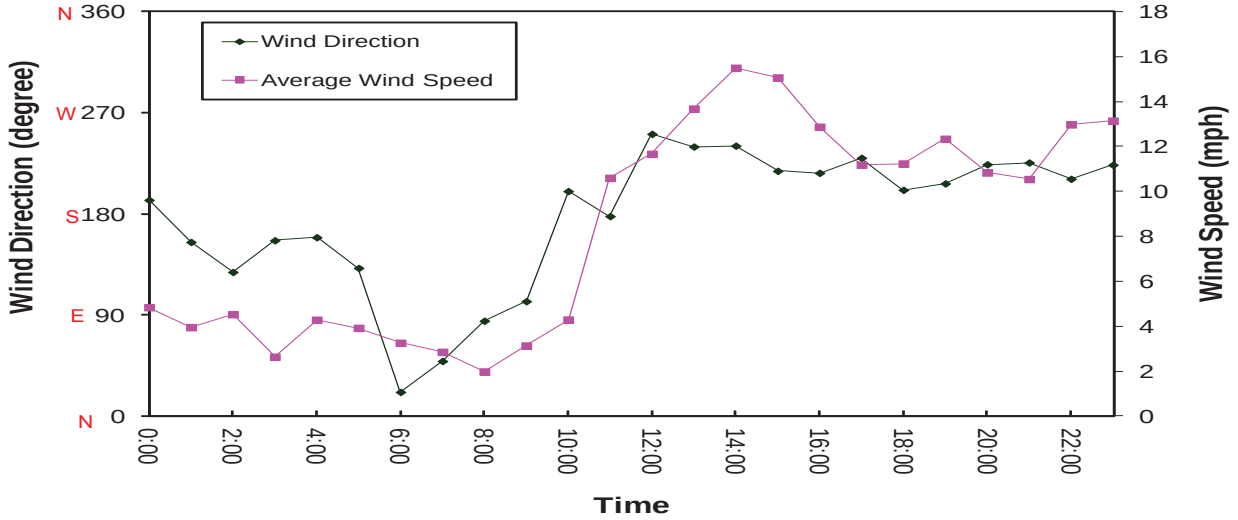
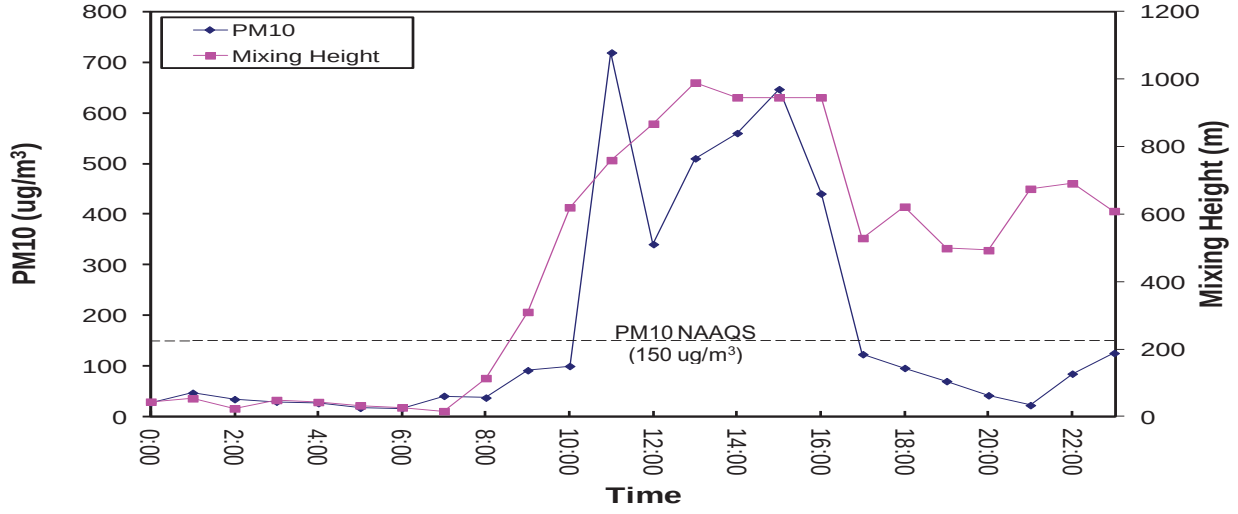


Figure D9. PM10 vs. Mixing Height



HIGH WIND DAY, 11/21/2008, STANFIELD

Figure D10. PM10 vs. Wind Speed

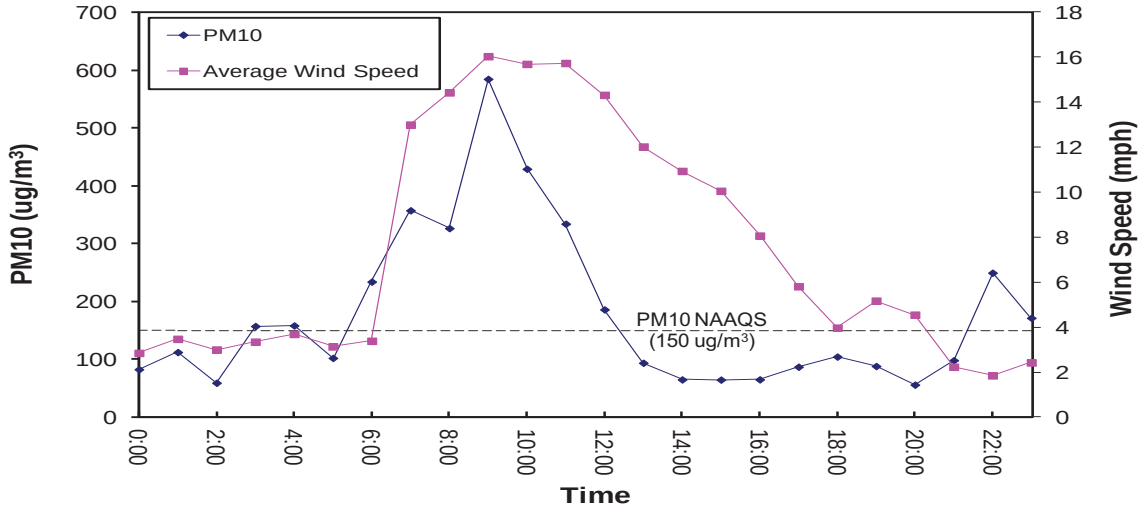


Figure D11. Wind Direction vs. Wind Speed

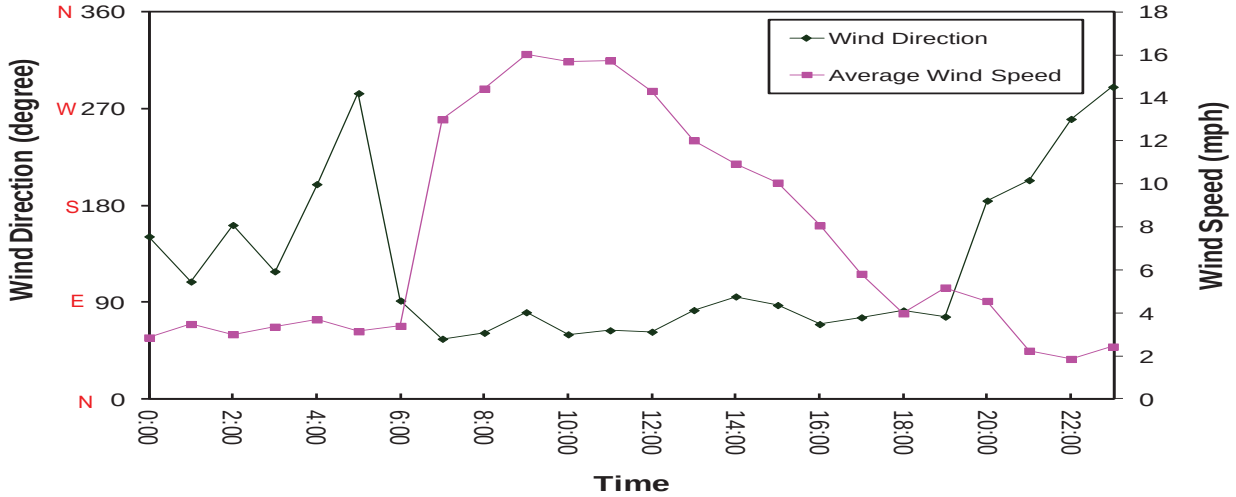
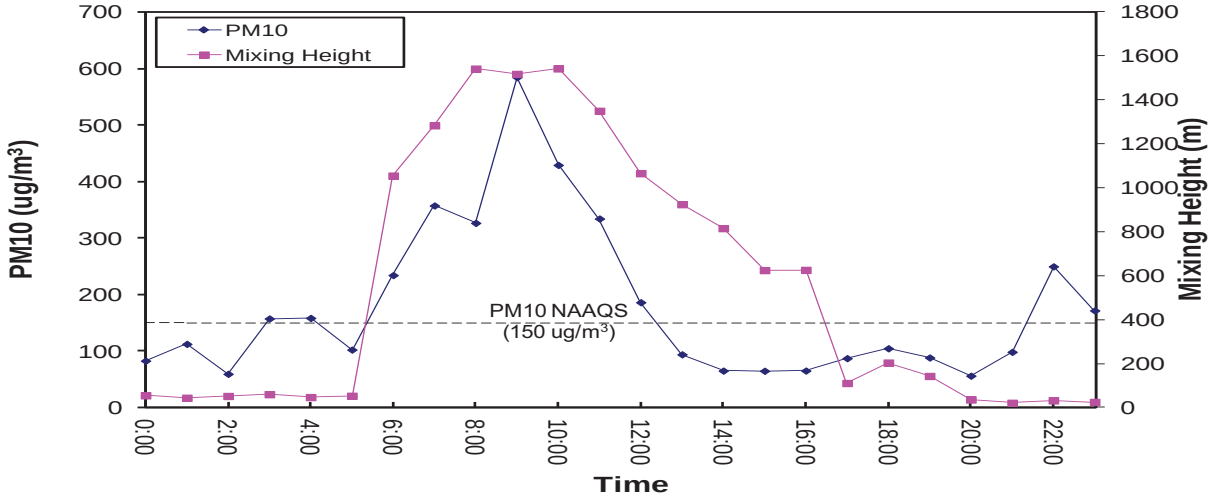


Figure D12. PM10 vs. Mixing Height



Appendix E

Statistics of the High Wind PM10 Exceedance Days at Pinal County Housing in 2008

Table E1. Statistics of the PM10 High Wind Exceedance Days at Pinal County Housing in 2008

Date	Number of High wind hours	Daily Average PM10 (ug/m^3)	Daily Average WSPD (mph)	Daily Max WSPD (mph)	Correlation of Hourly Wind Speed and PM10
11/9/2008	4	282	5	17	0.7954
5/21/2008	13	271	11	17	0.4827
1/1/2008	15	260	11	20	0.6639
5/15/2008	2	222	5	15	0.5432
9/11/2008	2	213	4	18	0.7246
8/15/2008	1	172	4	14	0.7661
10/27/2008	7	156	7	15	0.7750

HIGH WIND DAY, 01/01/2008, PINAL COUNTY HOUSING

Figure E1. PM10 vs. Wind Speed

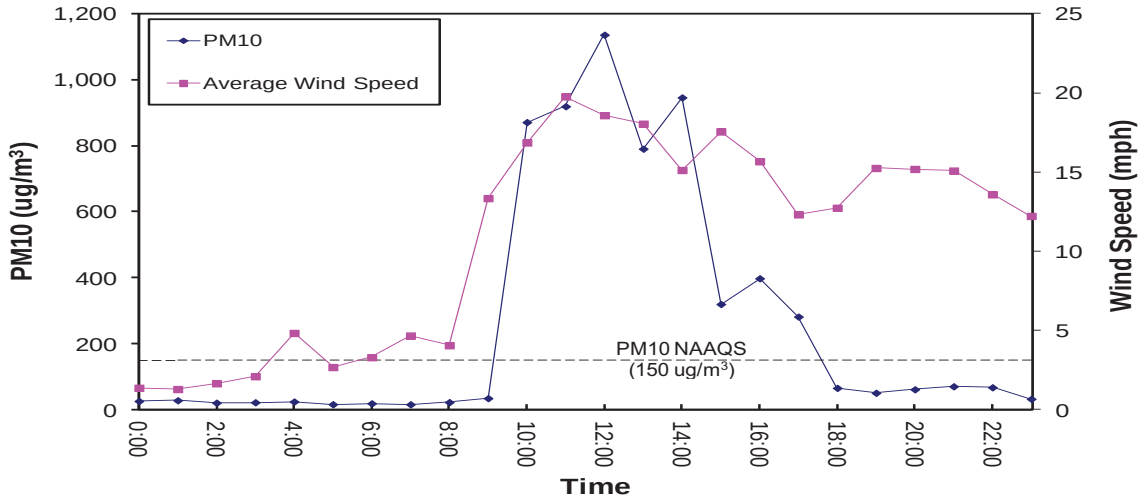


Figure E2. Wind Direction vs. Wind Speed

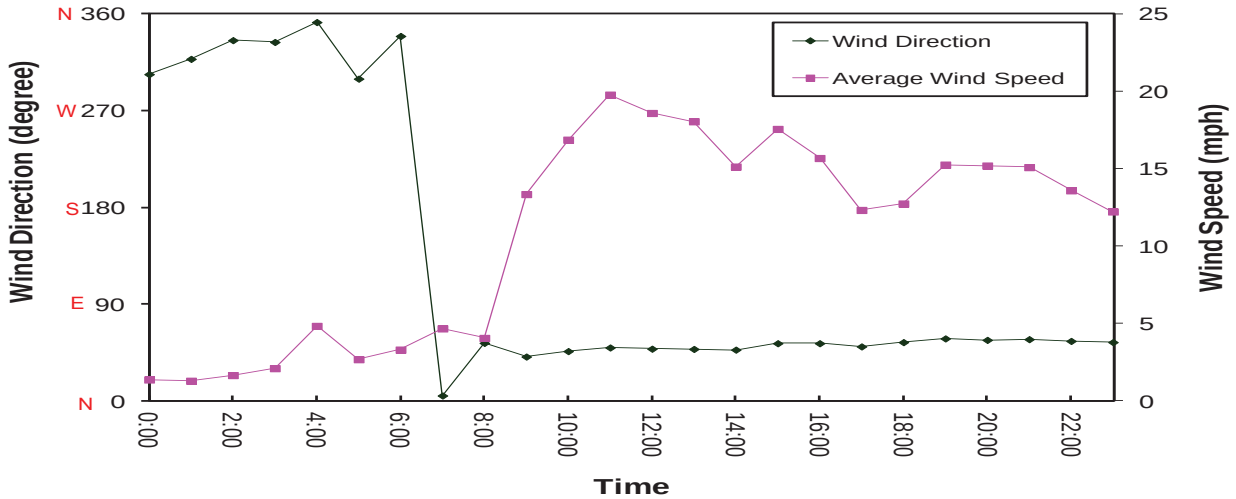
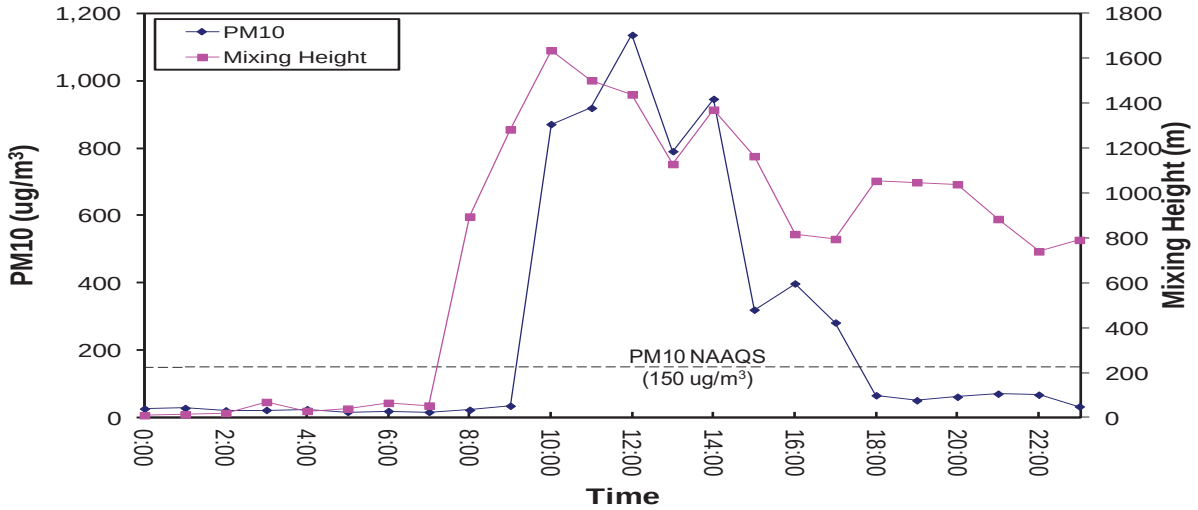


Figure E3. PM10 vs. Mixing Height



Appendix F

Statistics of the PM10 Exceedance Days at Maricopa in 2008

Table F1. Statistics of the PM10 High Wind Exceedance Days at Maricopa in 2008

Date	Number of High wind hours	Daily Average PM10 (ug/m^3)	Daily Average WSPD (mph)	Daily Max WSPD (mph)	Correlation of Hourly Wind Speed and PM10
1/1/2008	12	317	11	19	0.7112
8/7/2008	3	213	6	22	0.7717
9/11/2008	2	170	6	21	0.6398
10/11/2008	7	157	8	14	0.5433
10/27/2008	9	159	9	18	0.4384
11/9/2008	6	520	8	18	0.6795

HIGH WIND DAY, 10/27/2008, MARICOPA

Figure F-1. PM10 vs. Wind Speed

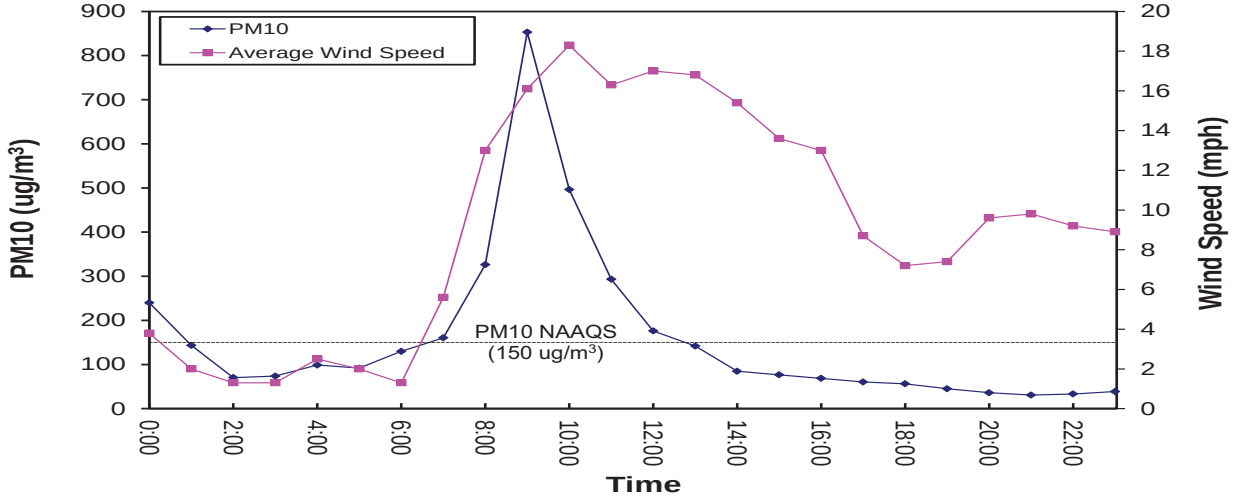


Figure F-2. Wind Direction vs. Wind Speed

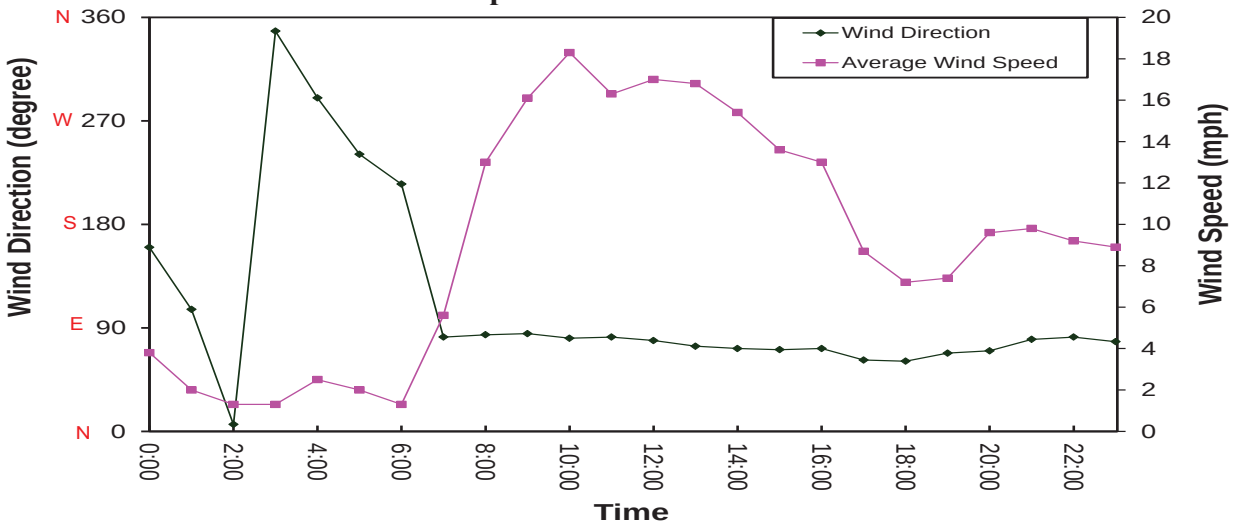
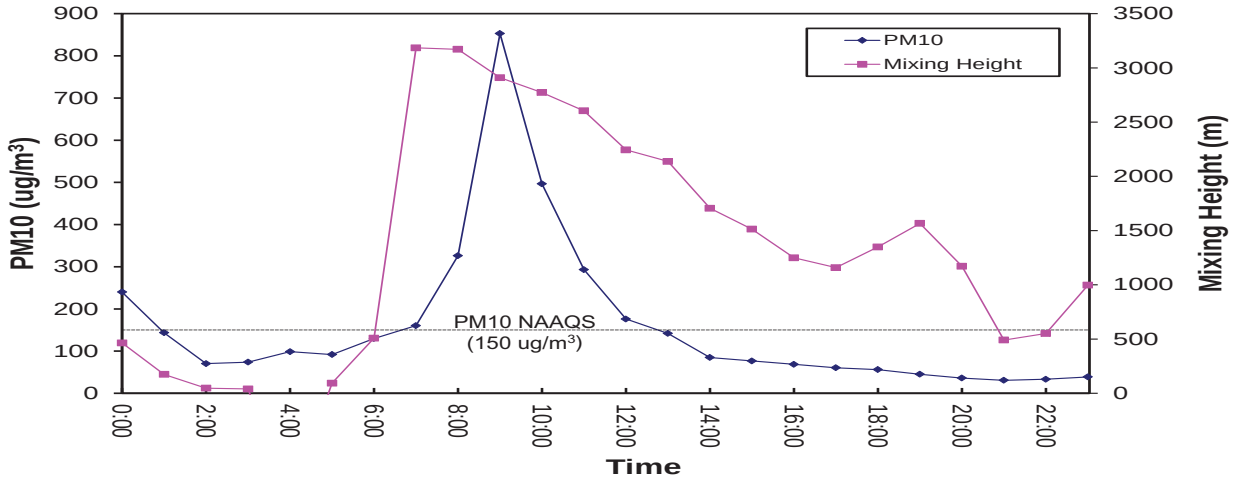


Figure F-3. PM10 vs. Mixing Height


PM10
Mixing Height
PM10 NAAQS
(150 ug/m3)
PM10 (ug/m3)
Mixing Height (m)
Time
0
100
200
300
400
500
600
700
800
900
0
500
1000
1500
2000
2500
3000
3500
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00

Appendix G

Statistics of the PM2.5 Exceedance Days at Cowtown in 2008

Table G1. Statistics of the PM2.5 Exceedance Days at Cowtown in 2008

Date	Daily Average PM2.5 (ug/m^3)	Daily Average PM10 (ug/m^3)	Daily Average WSPD (mph)	Daily Max WSPD (mph)
3/25/2008	42	497	3	5
4/12/2008	41	370	4	10
5/6/2008	40	304	7	16
4/30/2008	40	285	10	18
11/20/2008	38	345	3	6
6/23/2008	37	249	6	11
4/18/2008	36	362	3	7

PM2.5 DAY, 03/25/2008, COWTOWN

Figure G1. PM10 vs. Wind Speed

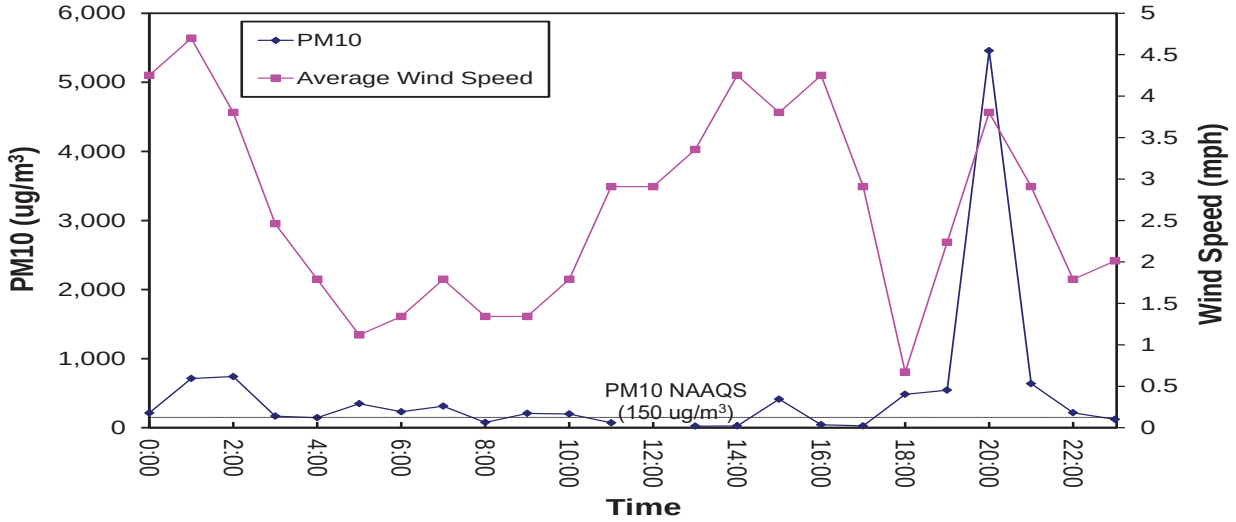


Figure G2. Wind Direction vs. Wind Speed

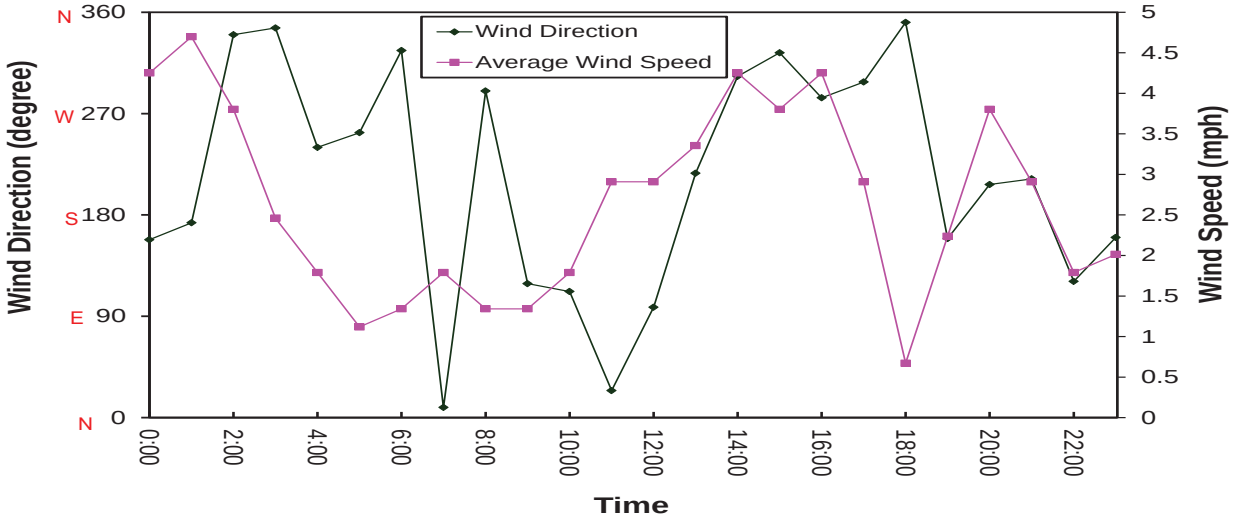
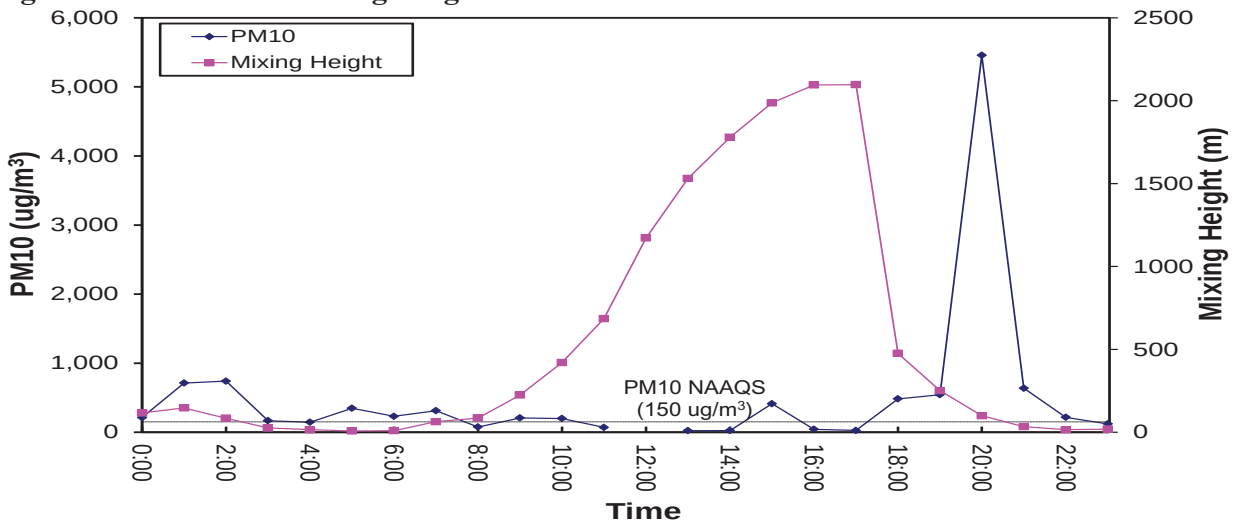


Figure G3. PM10 vs. Mixing Height



PM2.5 DAY, 04/12/2008, COWTOWN

Figure G4. PM10 vs. Wind Speed

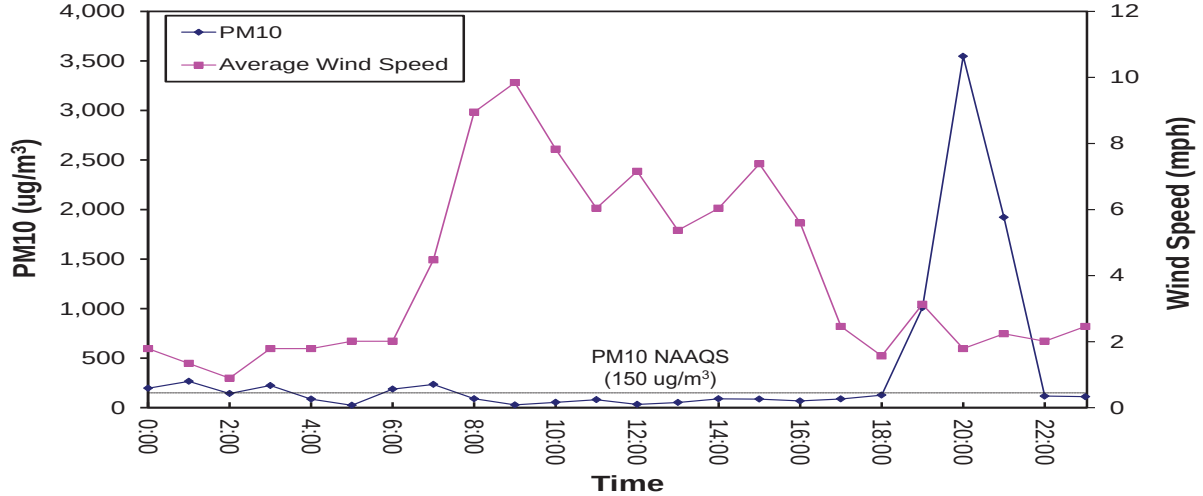


Figure G5. Wind Direction vs. Wind Speed

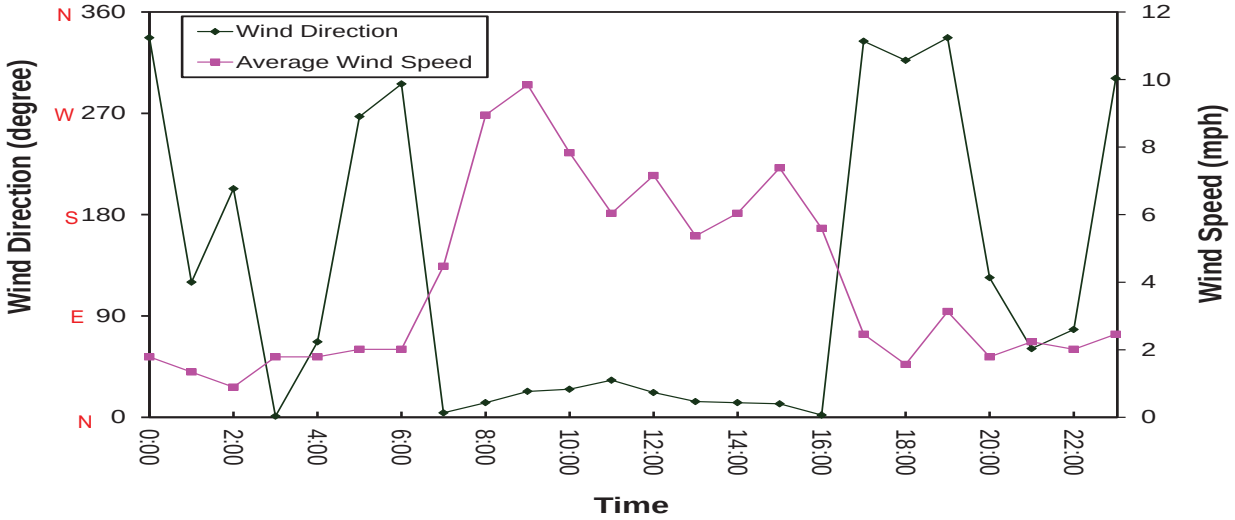
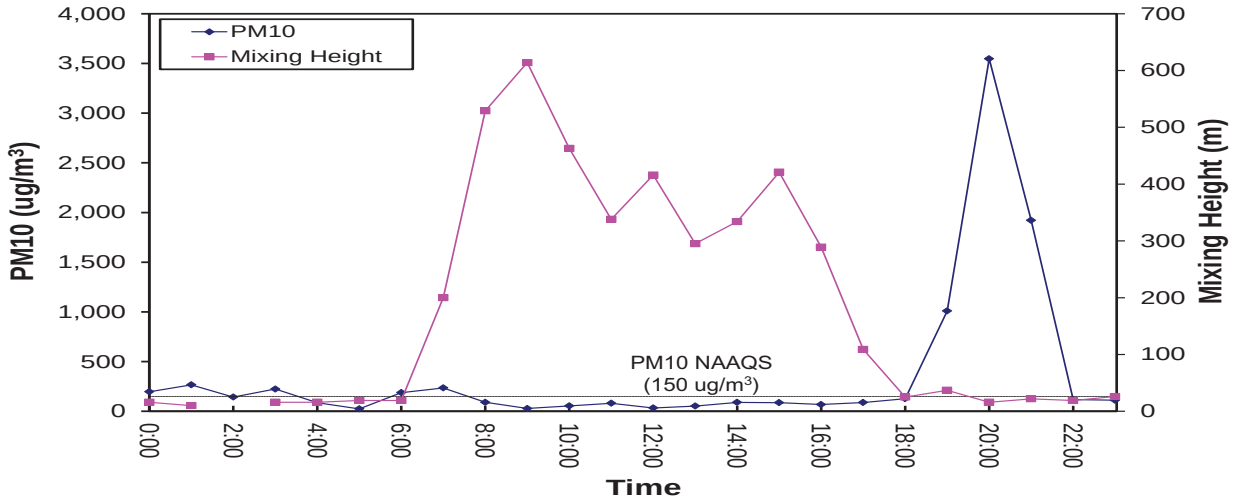


Figure G6. PM10 vs. Mixing Height



PM2.5 DAY, 05/06/2008, COWTOWN

Figure G7. PM10 vs. Wind Speed

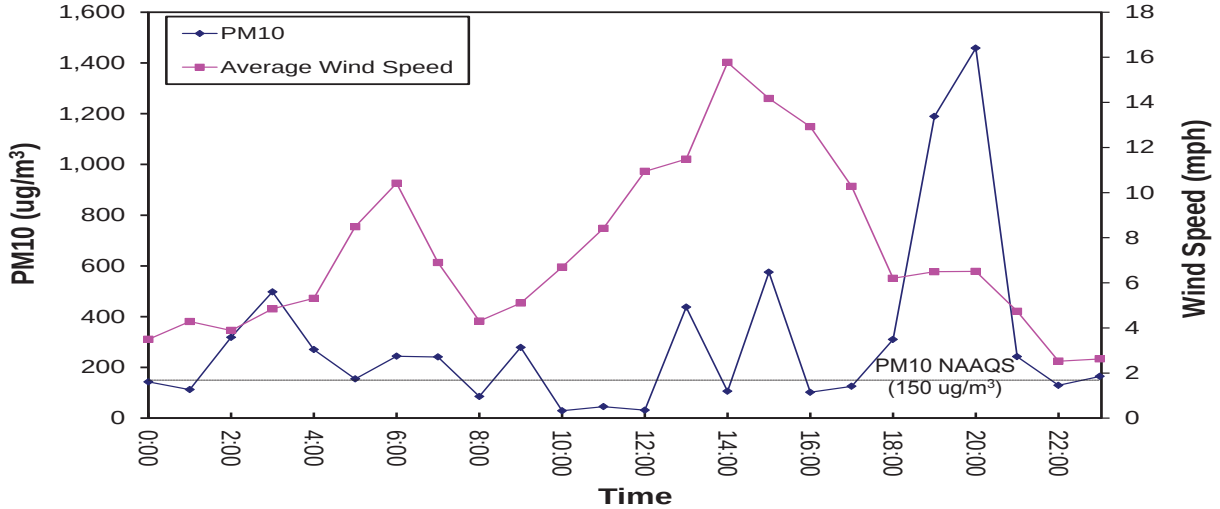


Figure G8. Wind Direction vs. Wind Speed

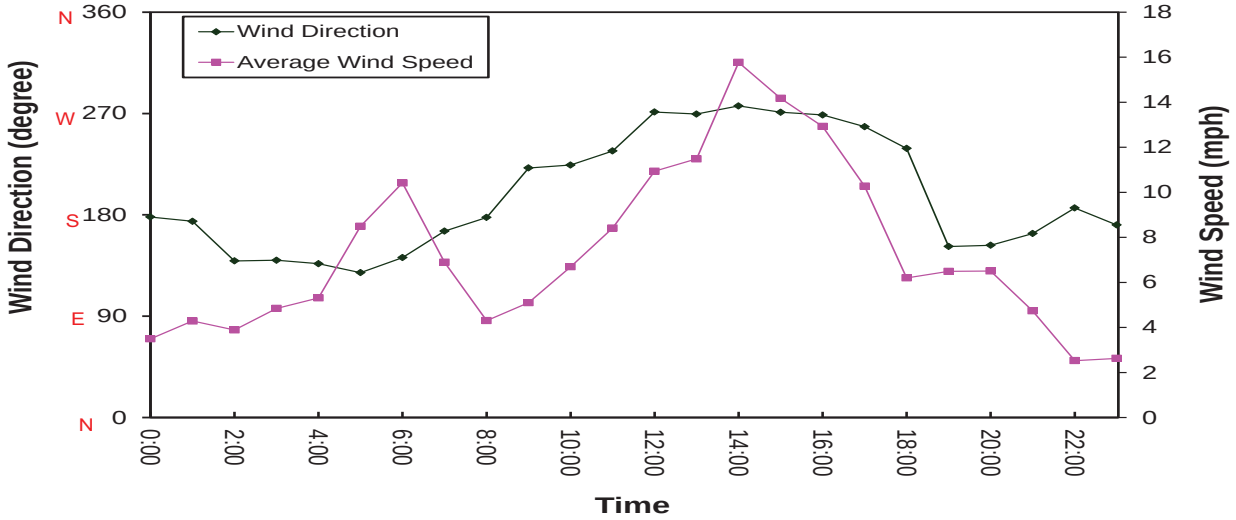
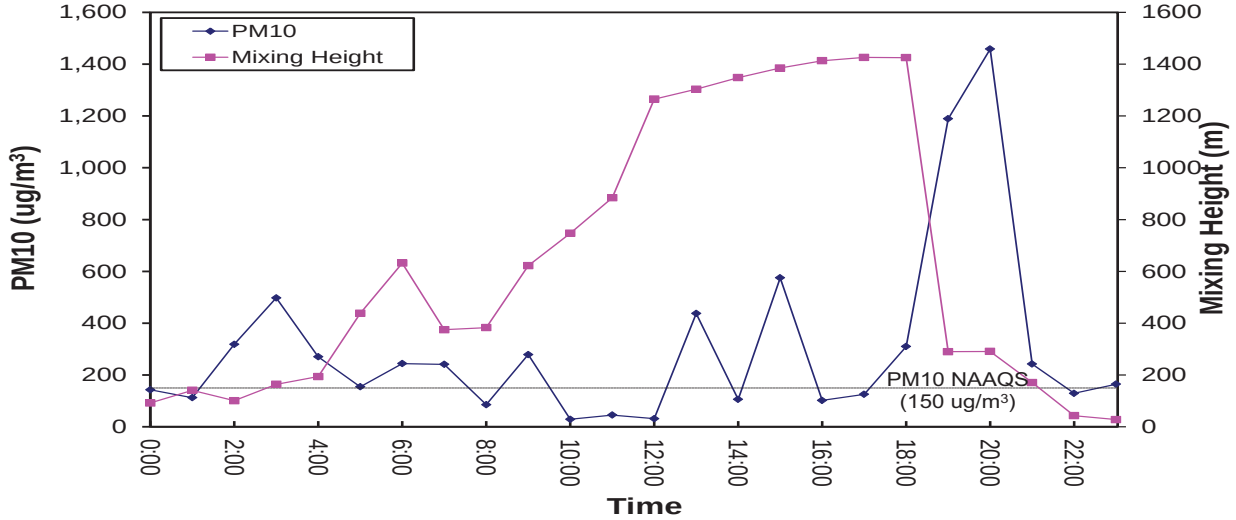


Figure G9. PM10 vs. Mixing Height



PM2.5 DAY, 04/30/2008, COWTOWN

Figure G10. PM10 vs. Wind Speed

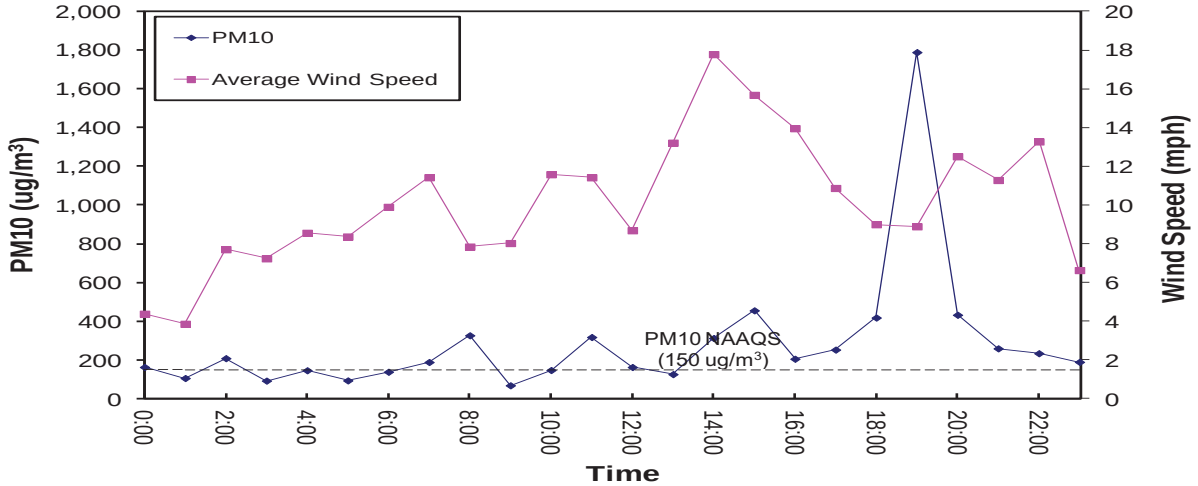


Figure G11. Wind Direction vs. Wind Speed

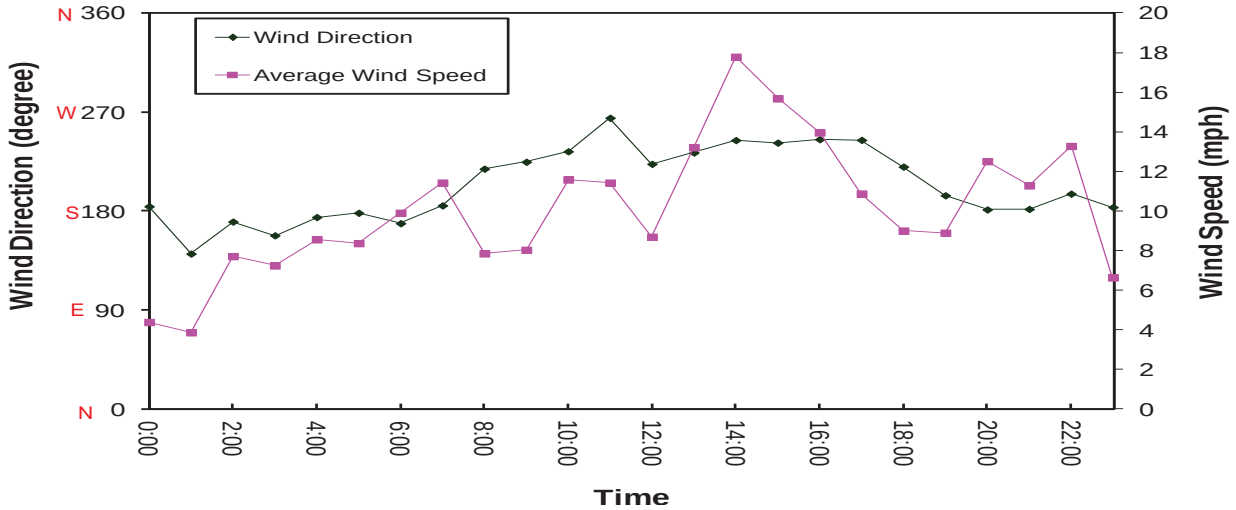
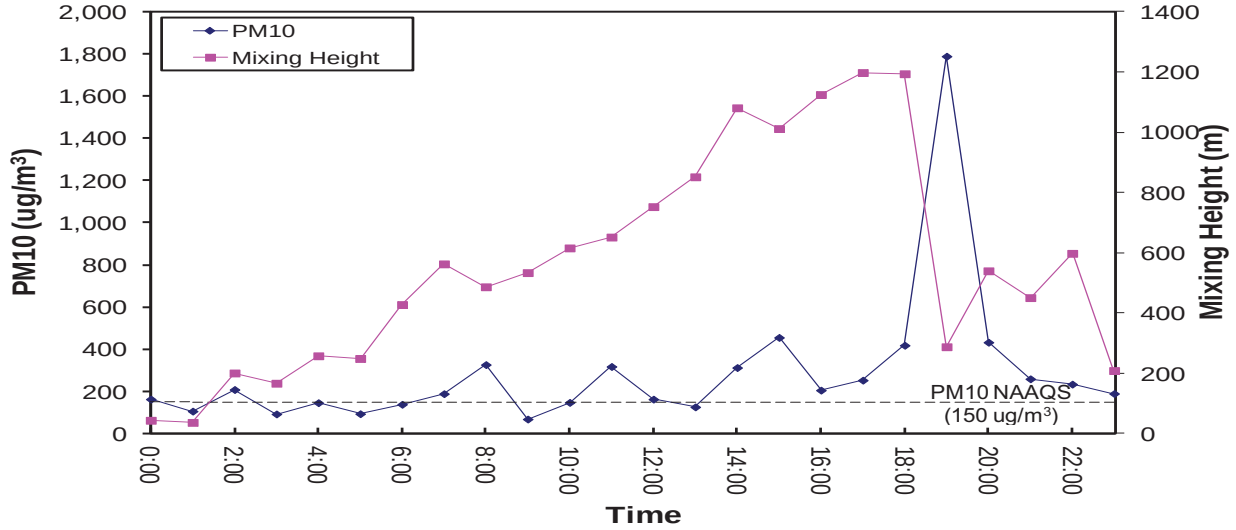


Figure G12. PM10 vs. Mixing Height



PM2.5 DAY, 11/20/2008, COWTOWN

Figure G13. PM10 vs. Wind Speed

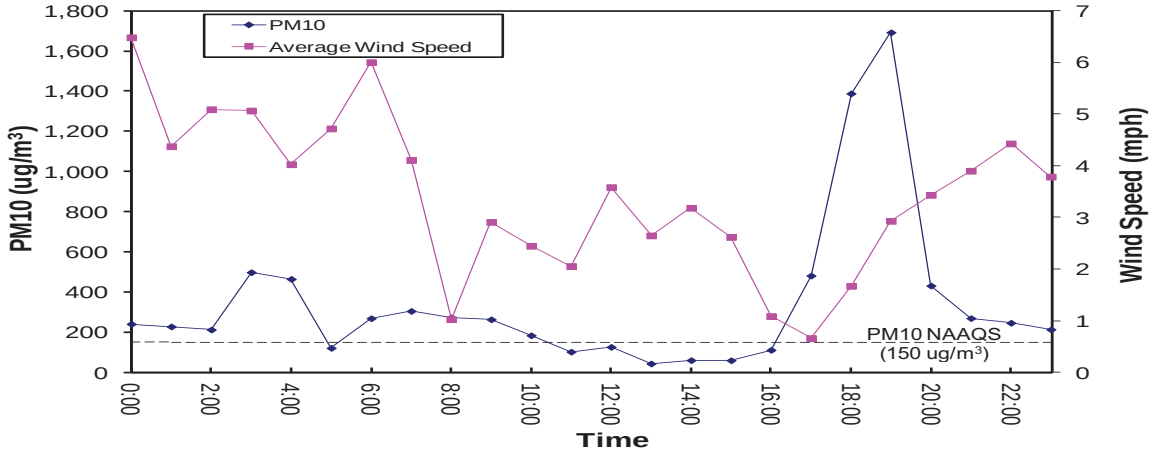


Figure G14. Wind Direction vs. Wind Speed

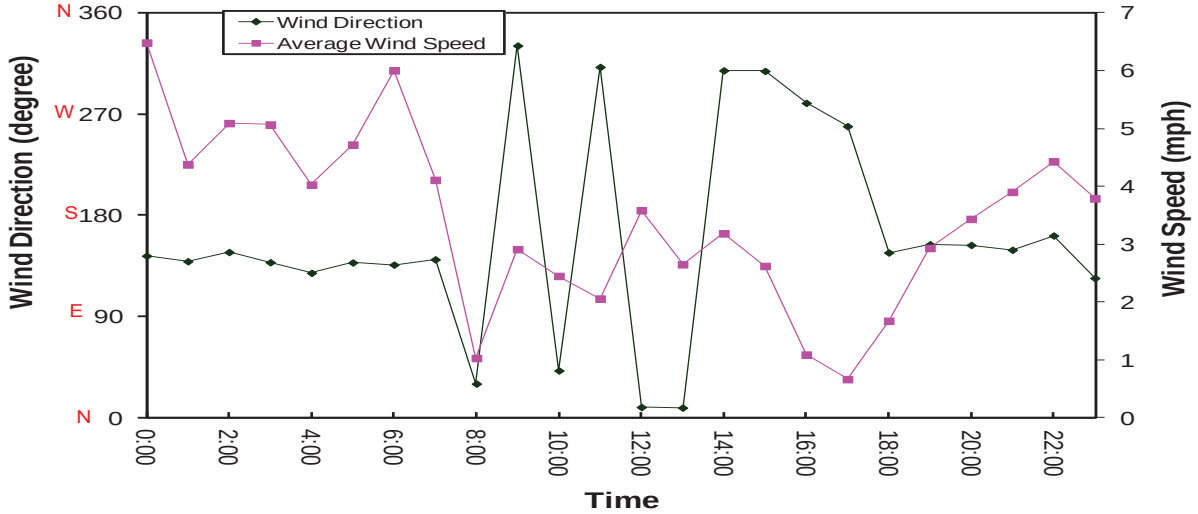
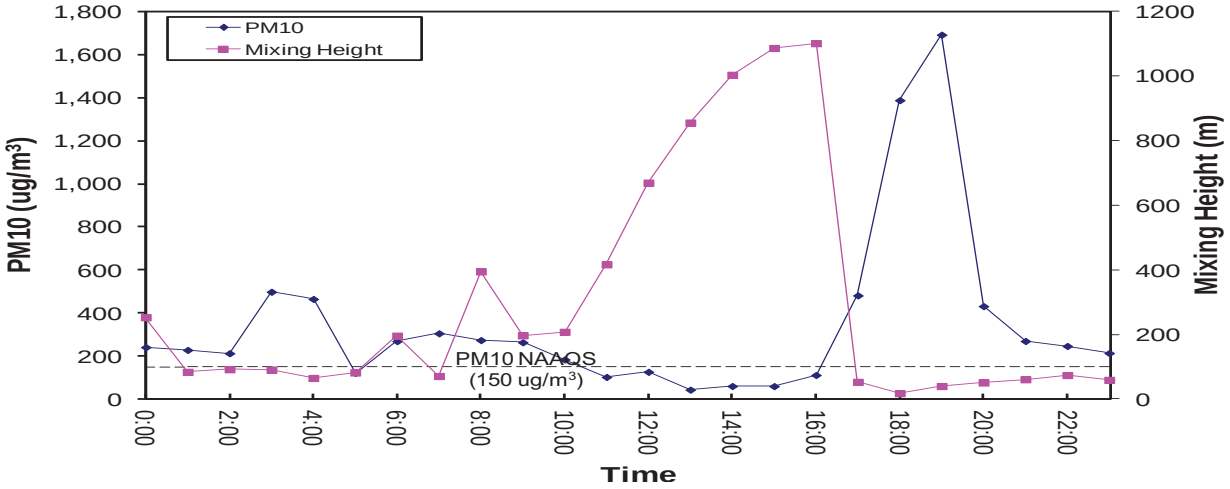


Figure G15. PM10 vs. Mixing Height



PM2.5 DAY, 06/23/2008, COWTOWN

Figure G16. PM10 vs. Wind Speed

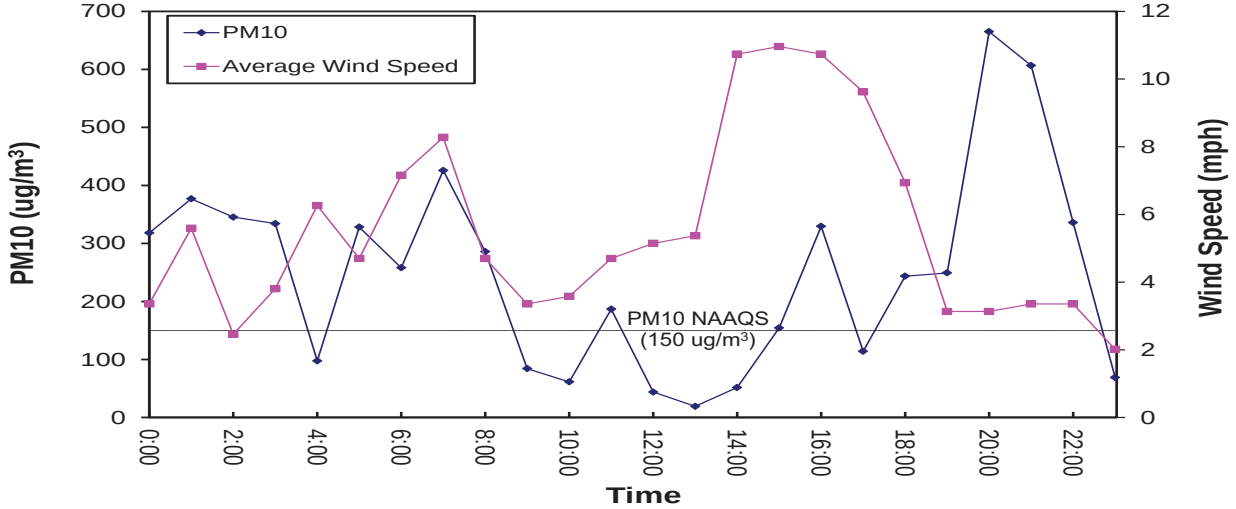


Figure G17. Wind Direction vs. Wind Speed

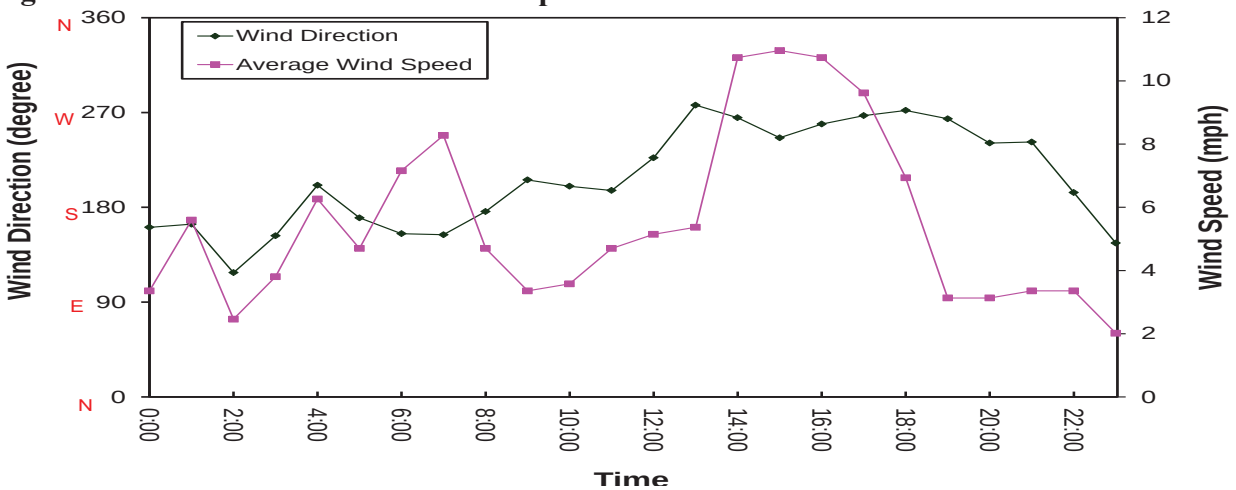
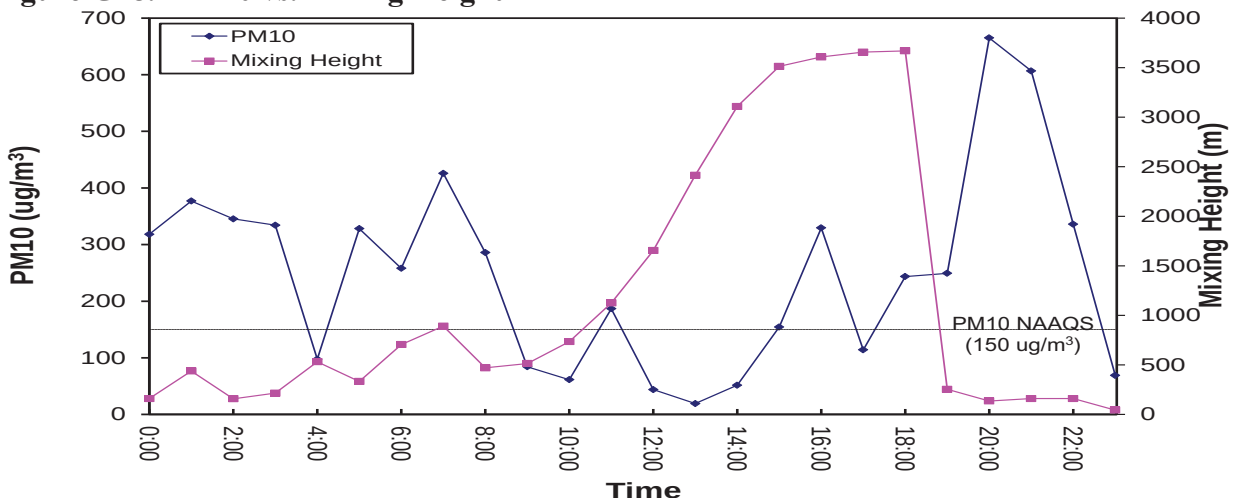


Figure G18. PM10 vs. Mixing Height



PM2.5 DAY, 04/18/2008, COWTOWN

Figure G19. PM10 vs. Wind Speed

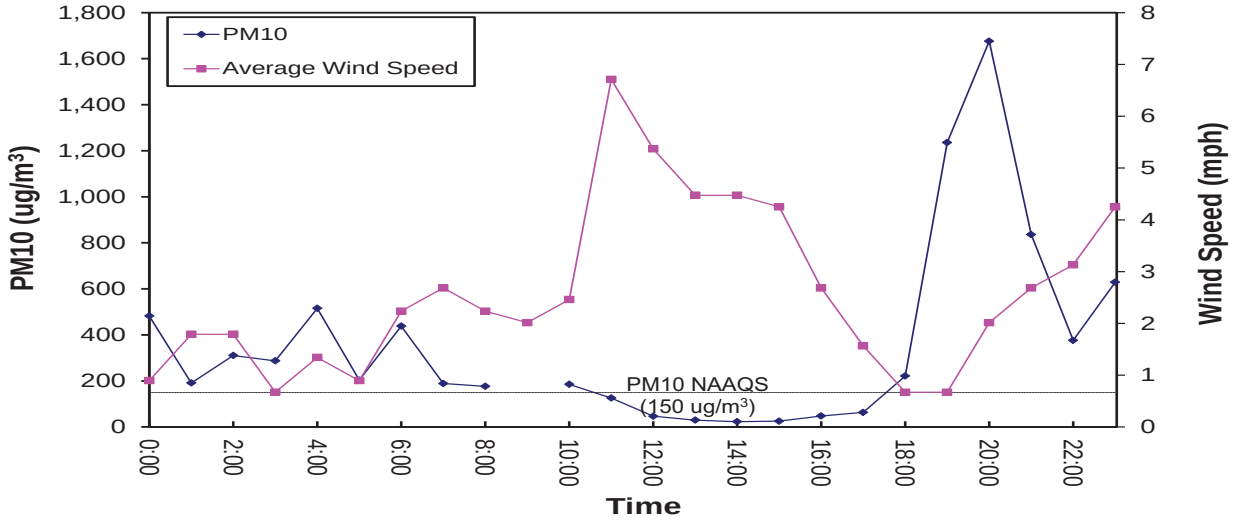


Figure G20. Wind Direction vs. Wind Speed

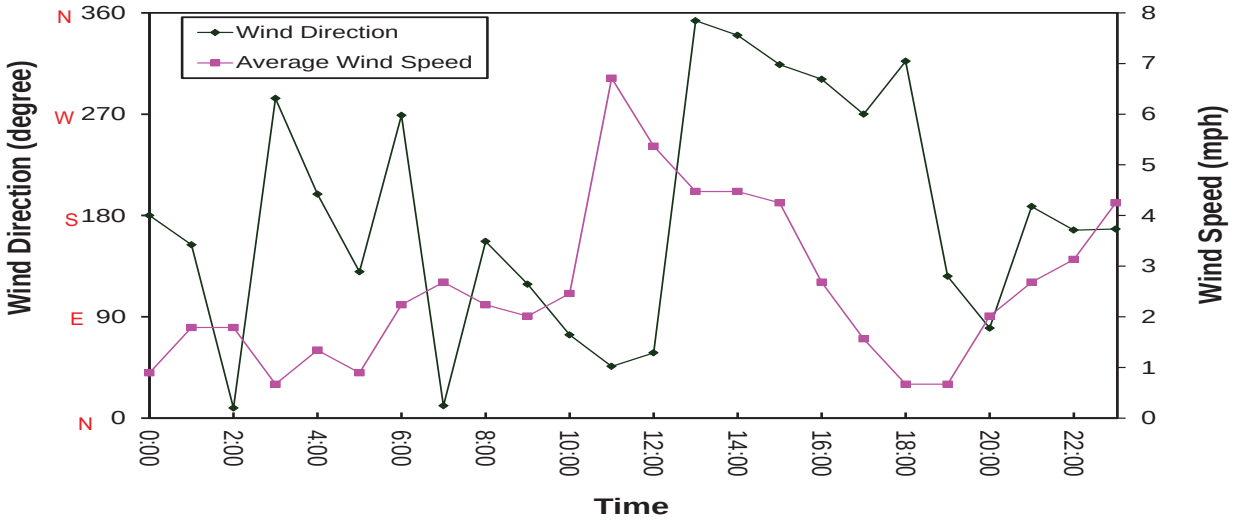
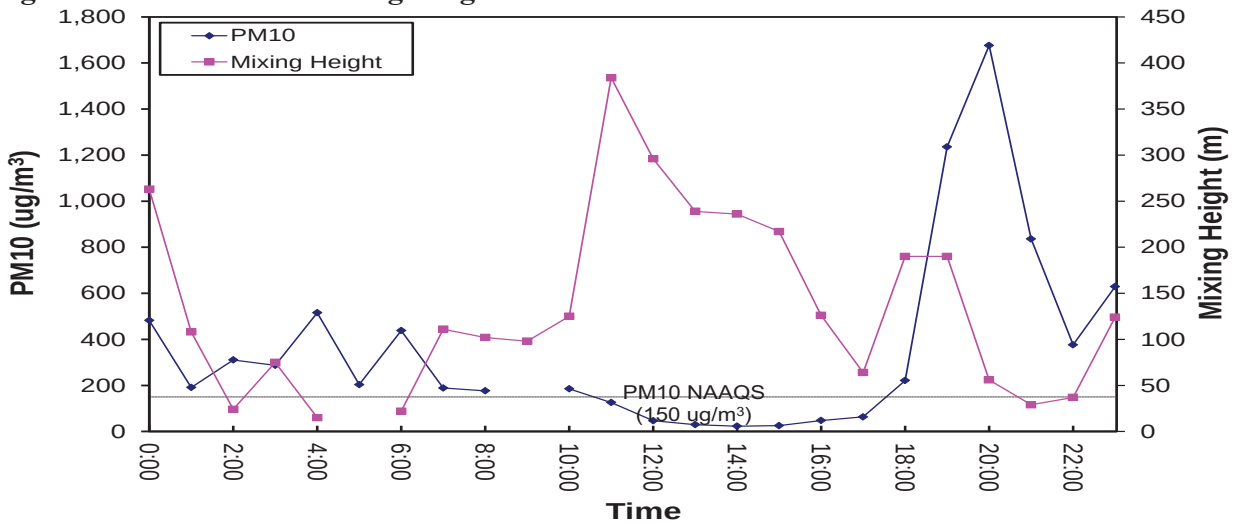


Figure G21. PM10 vs. Mixing Height



Appendix H

Road Count Data

ROAD COUNTS CONDUCTED BY PINAL COUNTY AIR QUALITY

Road Name	Road Surface	Location of Count	Month/Year of Count	Cars per day
Signal Peak Road	Dirt	~1/2 mile south of Hwy 87	October 2001	228
Diversion Dam Road	Dirt	At the end of the pavement	November 2001	127
Gary Road	Dirt	Between Lind Rd and Gail Rd	November 2001	904
Tweedy Road	Dirt	Just south of Kleck Road	December 2001	133
Bartlett Road	Dirt	Just west of Kenworthy Road	January 2002	139
Arizona Western Road	Dirt	~1/4 mile west of Eleven Mile Corner Road	January 2002	83
Judd Road	Dirt	~1/4 mile west of Gary Road	March 2002	154
Sossaman Road	Dirt	~1/2 mile south of Empire Blvd	April 2002	117
Ellsworth Road	Dirt	~1/4 mile south of Hunt Hwy	May 2002	193
White and Parker Road	Dirt	~0.1 mile north of Farrell Road	June 2002	456
Hartman Road	Dirt	~0.1 mile north of Maricopa-Casa Grande Highway	June 2002	88
Warren Road	Dirt	~0.1 mile south of Farrell Road	July 2002	80
Amarillo Valley Road	Dirt	~0.1 mile south of Clayton Road	July 2002	643
Christensen Road	Dirt	~2 miles north of Highway 287	August 2002	21
Peralta Road	Dirt	~0.1 mile northeast of Fransisco de Coronado Road	September 2002	86
San Juan Road	Dirt	~0.1 mile north of Solano Road	September 2002	343
Ivar Road	Dirt	~0.1 mile west of Gary Road	September 2002	200
Sherry Lane	Dirt	~0.1 mile west of Schnepf Road	October 2002	65
Hash Knife Road	Dirt	~0.2 mile east of Schnepf Road	November 2002	416
Mammoth Road	Dirt	~0.5 mile north of Selma Hwy	November 2002	50
Honeycutt Road	Dirt	~1.0 mile east of Hwy 387	December 2002	423
Barnes Road	Dirt	~0.6 mile east of Ralston Road	December 2002	115
Warren Road	Dirt	~0.1 mile south of Century	January 2003	340
Houston Road	Dirt	~0.4 mile west of Ganzel	February 2003	1042
Southwood Road	Dirt	Near the intersection with Country Lane	February 2003	81
Combs Road	Dirt	~0.2 mile east of Schnepf Road	February 2003	94
Macrae Road	Dirt	~0.1 mile south of Vah Ki Inn	March 2003	166
Jacob Waltz Road	Dirt	~0.1 mile west of Mountain View Road	March 2003	268
Mountain View Road	Dirt	~0.1 mile south of Lost Dutchman Road	April 2003	494
Lost Dutchman Road	Dirt	~0.1 mile west of Mountain View	April 2003	312
Price Road	Dirt w/ soil stabilizer	~0.3 mile east of Highway 79 (Friday thru Monday of Country Thunder)	April 2003	6676
Price Road	Dirt w/ soil stabilizer	~0.3 mile east of Highway 79 (Friday thru Wednesday of Country Thunder)	April 2003	4061
Navajo Road	Paved	~50 feet mile south of Papago Road (next to Stanfield monitor)	May 2003	91
Macrae Road	Dirt	~0.1 mile south of Vah Ki Inn	May 2003	174

Foothill Road	Dirt	~0.1 mile east of Cortez Road	June 2003	110
Signal Peak Road	Dirt	~0.1 mile north of Woodruff	August 2003	206
Signal Peak Road	Dirt	~0.4 mile south of Highway 87	August 2003	127
Hidalgo Street	Dirt	~0.1 mile west of Val Vista	August 2003	91
Lost Dutchman Road	Dirt	~0.1 mile east of Val Vista	September 2003	129
Hartman Road	Dirt	~0.1 mile north of Maricopa-Casa Grande Highway	September 2003	96
Farrell Road	Dirt	~0.9 mile east of White and Parker Road	October 2003	134
White an Parker Road	Dirt	~0.1 mile north of Maricopa-Casa Grande Highway	October 2003	343
Maricopa-Casa Grande Highway	Paved	~0.1 mile southeast of White and Parker Road (next to the Cowtown monitor)	October 2003	2717
Cowtown Road	Dirt	~0.1 mile northwest of Hartman Road	November 2003	146
Saddle Butte Street	Dirt	~0.1 mile east of Ironwood Drive	November 2003	319
Plaza Drive	Dirt	~0.1 mile south of Smoketree St	December 2003	114
Combs Road	Paved	~0.2 mile east of Ganzel Road (next to Combs monitor)	December 2003	2459
Wagon Wheel Road	Dirt	~0.1 mile north of Dove Roost Road	January 2004	173
Magma Road	Dirt	~0.1 mile east of Gary Road	January 2004	84
Davis Ranch Road	Dirt	~0.6 mile west of Bootleg Road	February 2004	220
Grande Valley Road	Dirt	~0.1 mile east of Way Out Road	February 2004	83
Tomahawk Road	Dirt	~0.1 mile north of McKellips Road	February 2004	231
Cactus Road	Dirt	~0.1 mile north of McKellips Road	March 2004	184
Blanco Drive	Dirt	~ 0.1 north of Val Vista Road	March 2004	126
Greasewood Street	Dirt	~ 0.1 mile east of San Marcos	March 2004	41
Desierto Road	Dirt/Gravel	~0.1 mile eat of Estrella Road	April 2004	118
Toluca Drive	Dirt/Gravel	~0.1 mile eat of Estrella Road	April 2004	51
Price Road	Dirt w/ soil stabilizer	~0.3 mile east of Highway 79 (Thur. thru Mon. of Country Thunder)	April 2004	5737
Caballero Road	Dirt/Gravel	~0.1 mile eat of Estrella Road	May 2004	122
Eleven Mile Corner Road	Paved	~0.1 mile south of Storey Road (next to PCH monitor)	June 2004	653
Gary Road	Dirt	~0.3 mile south of Judd	June 2004	141
Judd Road	Dirt	~0.1 mile west of Bryce Trail	July 2004	245
Brenner Pass Road	Dirt	~0.1 mile south of Phillips Road	July 2004	347
Bianco Road	Dirt	~0.1 mile south of Peters Road	August 2004	66
Florence-Kelvin Hwy	Paved	~1.1 mile south of Hwy 177	August 2004	75
Arroya Road	Dirt	~0.1 mile south of Superstition Blvd.	August 2004	17
Pacific Street	Paved	~0.1 mile north of Broadway	October 2004	164

		Ave		
Rolling Ridge Road	Dirt	~0.1 mile east of Schnepf Road	October 2004	362
Queen Anne Drive	Paved	~0.2 mile south of Cavendish Drive	November 2004	785
Arizona Hwy 88 (conducted by ADOT)	Paved	~0.1 mile southwest of Superstition Blvd	November 2004	3848
Arizona Hwy 347 (conducted by ADOT)	Paved	~0.5 mile south of AZ Hwy 238	June 2004	6787
Price Road	Dirt	~0.2 mile east of Hwy 79 (non-event weekend)	February 2005 2/25 AM thru 2/28 AM	213
Price Road	Dirt	~0.2 mile east of Hwy 79 (non-event weekend)	March 2005 3/4 PM thru 3/7 AM	175
Price Road	Dirt	~0.2 mile east of Hwy 79 (Girl Scout Jamboree weekend)	March 2005 3/11 AM thru 3/14 AM	541
Selma Highway	Dirt	~0.1 mile west of Peart Rd.	March 2005	89
Price Road	Dirt w/ soil stabilizer	~1.3 mile east of Highway 79 (Fri. thru Mon. of Country Thunder)	April 2005	6243
Hidden Valley	Dirt	~0.1 mile north of Farrell Rd.	April 2005	Road tube cut twice
Evans Road	Dirt	~0.1 north of Warren Rd.	July 2005	73
Southern Avenue	Dirt	~0.1 mile east of Geronimo Rd.	July 2005	120
Moon Vista Road	Dirt	~0.1 mile east of Ironwood Rd.	September 2005	105
Hunt to Empire Short Cut T3SR7E between S2&3	Private Property – not a road – Dirt	~0.1 mile north of Hunt Hwy	September 2005	216
Hash Knife Road	Dirt	~0.1 mile east of Schnepf	October 2005	424
Cooper Road	Dirt	~0.1 mile north of Arizona Farms Rd	October 2005	370
Scorpio Road	Dirt	~0.1 mile west of Henness Road	October 2005	25
Tweedy Road	Dirt	~0.1 south of Hwy 287	December 2005	95
Varnum Road	Dirt	~0.1 mile south of Judd Road	January 2006	71
Libra Road	Dirt	~0.1 mile east of Sagittarius Road	February 2006	55
Hewitt Station Road	Dirt	~1.8 mile north of Hwy 60	March 2006	125
Reddington Road	Dirt	~ 0.1 mile north of the County line	March 2006	112
Reddington Road	Dirt	At the end of the pavement	March 2006	162
Price Road	Dirt w/ soil stabilizer	~1.3 mile east of Highway 79 (Thu. thru Mon. of Country Thunder)	April 2006	5952
Price Road	Dirt	~1.3 mile east of Highway 79 (Fri. thru Mon. of non-event weekend)	April 2006 4/14/06 AM thru 4/17/06 AM	212
Mitchell Trail	Dirt	~0.1 mile south of Arizona Farms Rd.	April 2006	165

Southwood Road	Dirt	~0.1 mile east of Kenworthy	May 2006	174
Sherry Lane	Dirt	~0.1 mile east of Kenworthy	May 2006	213
Hartman Road	Dirt	~0.1 mile north of Honeycutt Rd.	July 2006	81
Cooper Road	Dirt	~0.1 mile south of Judd Rd.	September 2006	225
Gary Road	Dirt	~0.1 mile north of Silverdale	October 2006	742
Hopi Road	Dirt	~0.1 mile east of Trekell	November 2006	170
Arabian Road	Dirt	~0.2 mile south of Organ Pipe Rd.	December 2006	61
Dune Shadow Road	Dirt	~0.1 mile west of Amarillo Valley Rd.	January 2007	291
Phillips Road	Dirt	~0.1 mile east of Sunland Gin Road	January 2007	100
Geronimo Road	Dirt	~0.1 mile north of Broadway Road	January 2007	270
Arabian Road	Dirt	~0.2 mile south of Organ Pipe Rd.	January 2007	60
Magma Road alignment (utility easement)	Dirt	~0.1 mile east of Edwards Rd.	February 2007	37
Mountain View Road	Dirt	~0.1 mile south of Lost Dutchman Rd	March 2007	214
Mountain View Road	Dirt	~0.1 mile north of Lost Dutchman Rd	March 2007	74
Mountain View Road	Dirt	~0.1 mile north of Jacob Waltz Rd	April 2007	206
Mountain View Road	Dirt	~0.1 mile east of Mountain View Rd	May 2007	181
Price Road	Dirt w/ soil stabilizer	~1.3 mile east of Highway 79 (Thu. thru Mon. of Country Thunder)	April 2008 4/17/08 AM thru 4/21/09 AM	9150
Clayton Road	Dirt	~0.1 mile east of Ethington Rd.	June 2008	103
Bianco Road	Dirt	~0.1 mile south of Peters Rd.	June 2008	115
Ethington Road	Dirt	~0.1 mile south of Clayton Rd.	June 2008	126
Price Road	Dirt w/ soil stabilizer	~1.3 mile east of Highway 79 (Wed. thru Mon. of Country Thunder)	April 2009 4/1/09 AM thru 4/6/09 AM	6681
Price Road	Dirt w/ soil stabilizer	~1.3 mile east of Highway 79 (Tue. thru Mon. of Country Thunder)	April 2010 4/13/09 AM thru 4/19/09 AM (4/15 6pm thru 4/16 8am lost)	6760
Cooper Road	Dirt	0.1 mile south of Magma Rd.	August 2011 (8/12-19/11)	383
Cooper Road	Dirt	0.1 mile south of Magma Rd.	August 2011 (8/22-29/11)	310

Appendix I

A Method for the Back-Calculation of Wind-Blown Emission Factors from Field Measured PM10 Concentrations

Arizona Department of Environmental Quality
Air Quality Division

A Method for the Back-Calculation of Wind-Blown Emission Factors from Field Measured PM_{10} Concentrations

Arizona Department of Environmental Quality
Air Quality Division

ABSTRACT

Regional variability in soil characteristics, meteorological trends, and surface disturbances lead to changes in wind blown emission factors (EFs) for a given land use (LU). Therefore, it is prudent to determine accurate EFs for Pinal County in order to provide the most accurate wind blown Emission Inventory (EI) for the completion of the Pinal County State Implementation Plan (SIP). Emission Factor Back Calculation (EFBC) is currently being proposed as a method of wind blown EF estimation in place of wind blown EF literature values for the creation of the Pinal County PM_{10} State Implementation Plan (SIP). This method relies on the use of field measured PM10 concentrations and meteorological data to back-calculate EFs for different land uses. The method depends on accurate completion of the following steps: 1) Land Use Classification, 2) Meteorological and Emission Data Processing, 3) Estimation of Emission Origination Area, 4) ArcGIS Data Integration, and 5) EF Statistical Optimization. Furthermore, the model uses the following simple linear approach during the statistical optimization step:

$$E_n = A_n * EF_n$$

where E_n is total emissions for each land use within a given footprint (tons/hr), A_n is the calculated area of each land use located within each footprint (m^2), and EF_n is the estimated emission factor for each land use located within a given footprint.

This paper presents the steps taken in the EFBC process and further presents a testing of the model, where the proposed SIP design day for the Pinal County Housing monitor of 1/1/2008 was modeled to estimate EFs for 9 different land uses. The estimated hourly EFs were then used to calculate hourly emissions for the design day. Individual hour variability between model estimated PM10 concentrations and PM10 concentrations measured in the field varied between 2% and 282% over the 24 hour period. The average 24 hour PM_{10} concentration for PCH on 1/1/2008 was 264.9 $\mu g/m^3$ as measured at the monitor. The model predicted a 24 hour average concentration for PCH on the design day of 260.4 $\mu g/m^3$.

INTRODUCTION

The Arizona Department of Environmental Quality (ADEQ) in cooperation with the Pinal County Air Quality Department is in the process of preparing a State Implementation Plan (SIP) for particulate matter less than 10 µm (PM_{10}). The purpose of the SIP is to protect human health and welfare through: 1) air monitoring data and analysis, 2) PM_{10} emission inventory, 2) air dispersion modeling to determine maximum concentrations of pollutants, and 4) control measures used in controlling particulate emissions in order to attain the PM_{10} and $PM_{2.5}$ standard.

Airborne particles are a serious threat to human health. Major health concerns due to exposure to PM_{10} include: effects on breathing and respiratory systems, damage to lung tissue, cancer, and premature death. The elderly, children, and people with chronic lung disease, influenza, or asthma, are especially sensitive to the effects of particulate matter.

Ambient levels of PM_{10} measured at air quality monitoring stations within Pinal County show widespread, frequent, and in some instances, severe, violations of the PM_{10} standard, dating back to 2002. Pinal County's PM_{10} levels are among the highest in the country. Based on 2009 – 2011 certified air quality data, the Pinal County Housing monitor, located approximately 11 miles east of Casa Grande, averaged over 14 recorded exceedances per year of the 1987 PM_{10} ambient air quality standard of 150 micrograms per cubic meter ($\mu g/m^3$).

Ambient monitors located in the new nonattainment area routinely record concentrations two to three times the level of the standard and several monitors have recorded levels approaching or exceeding the significant harm level of 600 ($\mu g/m^3$). After reviewing available data, EPA redesignated much of the western half of Pinal County to nonattainment for the 1987 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) on May 23, 2012. See 75 FR 60680, October 1, 2010.

Redesignation of the western portion of Pinal County to nonattainment requires the State to create a State Implementation Plan (SIP) which proposes reasonable control methods to reduce PM_{10} emissions in Pinal County to levels which comply with EPA's PM_{10} ambient air quality standard. Conformity with these standards are exhibited through modeling of exceedance days prior to and following control technology implementation to demonstrate adequate emissions reductions have been estimated. Modeling is highly dependant on an intimate understanding of the factors within a region that contribute to emissions during low wind, stagnation, and high wind periods.

Low wind emissions are dominated by mechanical activities which cause the entrainment of particulate matter into the atmosphere. As wind speeds increase, wind blown dust entrainment increases resulting in a lower proportion of field measured PM10 concentrations originating from activity based PM entrainment. The degree to which wind blown emissions contribute to ambient air PM_{10} concentrations is dependant on the land use being analyzed. Different land uses can exhibit varying degrees of soil moisture,

soil texture, soil disturbance, surface roughness, and impermeable layer coverage. Furthermore, these characteristics can change for land uses within different regions of the US, State, or even County. For this reason, it is important to identify site specific windblown emission factors (EFs) rather than relying on literature based EFs which may originate from measurements taken from a variety of different locations.

Since performing field measurements of windblown EFs for a variety of land uses using a wind tunnel is resource intensive, ADEQ proposes another method of estimating windblown EFs. The Emission Factor Back Calculation (EFBC) method utilizes field measured meteorological and PM10 concentration data for the sites and periods of interest in order to estimate EFs for land uses that are characteristic for that region. Using field measured meteorological data, the EFBC method estimates emission particle origination areas in order to determine what land uses are contributing emissions impacting the monitor during a period of interest. The method then employs a statistical optimization approach to estimate the most logical EF for each land use within the contributing area.

In this document, ADEQ presents the steps taken to implement the EFBC method. ADEQ further tests the estimated EFs to determine how well PM10 concentrations are calculated using these EFs against the field measured PM10 concentrations for the proposed model design day and location of 1/1/2008 for the Pinal County Housing monitor.

METHODS

The process behind EF back-calculation first relies on land use classification into distinct categories. These categories should cover all land uses necessary to perform a comprehensive EI calculation for the non-attainment area. The second step of the EF back-calculation process is data processing of meteorological and PM10 concentration field data in order to remove periods of incomplete data. This step further requires wind speed, wind direction, mixing height (the height at which there is negligible vertical atmospheric mixing), air temperature, sensible heat flux (the conductive heat flux from the Earth's surface to the atmosphere), and PM10 concentration data be averaged at the daily scale and for some categorizes to be analyzed for variability to insure a group of representative sample periods are utilized for analysis. The third step utilizes the Korman and Meixner analytical footprint model in order to estimate particle emission origination location. This method utilizes probability analysis to calculate an area from which particles (PM_{10}) are most likely to have originated. The next step requires the integration of aerial photography, calculated footprint extents, and land use information into ArcGIS in order to characterize the land uses located within each footprint surrounding the monitors of interest. One footprint analysis is performed for each land use classification previously categorized. The idea is to use the total emissions (as determined from PM_{10} monitor measurements) and the calculated area of each land use (as determined from ArcGIS) within a footprint to back calculate the unknown emission factors utilizing the equation:

$$E_n = A_n * EF_n$$

These equations cannot be solved individually, but must be solved utilizing a statistical optimization technique such as the Newton Method. The Newton Method requires an equal number of equations as unknowns. Therefore, if nine land use types have been identified for EF estimation, nine different equations and thus nine individual footprints must be described. Once all footprints have been created, the Newton Method can be used to solve for all EF's simultaneously by using the Excel Addin known as Solver.

The following sections will outline the steps which were taken to implement this method for the Pinal County Housing (PCH) proposed design day of January 1, 2008. The following steps to the EFBC method are described:

- Land Use Classification
- Meteorological and PM10 Concentration Data Processing
- Estimation of Emissions Origination Area
- ArcGIS Data Integration
- EF Statistical Optimization

Following the estimation of EFs, the proposed design day for PCH of January 1st was modeled to assess the accuracy of these EFs to produce field collected PM10 concentration values.

Land Use Classification

The first step in the EFBC method is to identify and classify the land use types which require EF determination. This will be limited to those land use types within approximately 6 km of the PM_{10} monitors (the distance from the monitors will change with the wind speed examined). For all meteorological conditions tested, land use classification for a 6 km radius area surrounding the monitor was adequate since the Footprint estimation model only identifies those land uses contributing 90% of total emissions to the monitor. Therefore, the footprint emissions origination model predicts that for the meteorological extremes tested in Pinal County, emissions originating from >6 km from the monitor will always comprise < 10% of the total emissions impacting the monitor. Aerial photography and activity records supplied by Pinal County Air Quality Department (PCAQD) were used to classify land uses. The following land uses were identified within 6 km of the Stanfield, Cowtown, Maricopa, and Pinal County Housing monitors:

- Developed Urban Lands
- Developed Rural Lands
- Paved Roads
- Unpaved Roads
- Cleared Areas

- Construction Areas
- Concentrated Animal Feeding Operations - CAFOs (Feedlots & Dairies)
- Desert Shrubland
- Cropland (Fallow & Vegetated)

Characterization of land use for the 1/1/2008 design day was achieved through the examination of an aerial photograph taken of the western portion of Pinal County in early April of 2008 (LandisCor), PCAQD and ADEQ road maps, and 2008 active CAFO location maps and active construction areas provided by PCAQD. Each land use required the creation of 1 emission footprint (as discussed later in this document). Therefore, 9 land use classifications will require 9 footprints with each footprint's extent covering a unique land use classification.

Meteorological and Emission Data processing

The next step requires the acquisition and processing of wind speed, wind direction, mixing height, sensible heat flux, and field measured PM10 concentration data from the stations of interest. For the purposes of testing the PCH 1/1/2008 design day, data was processed from 4 monitors within the nonattainment area: Cowtown, Pinal County Housing, Stanfield, and Maricopa. These 4 monitors recorded the highest number of exceedances during the year of 2008 providing the most conservative datasets available from a regulatory standpoint. Furthermore, processing multiple meteorological and PM10 concentration datasets allowed ADEQ to create EFs representative of the entire nonattainment area rather than for a small section of the nonattainment area.

The first step of data processing was to isolate only the hourly data which occurred during the winter of 2008 (December 22nd – March 20th). Arizona Meteorological Network (AZMET) rainfall data was analyzed for all rain gauges located within the nonattainment area. Any date when a rain gauge registered greater than 2 mm for the day was removed from the data pool to minimize the effects of precipitation. Hourly periods where data were missing were interpolated. Wind speed, wind direction, and PM_{10} concentration values were taken from field measurements. Mixing heights and sensible heat fluxes were calculated by AERMET using meteorological data (including upper air sounding information) from Tucson, AZ. Hourly seasonal temperature was averaged from AZMET values for the year of 2008. Hourly data at each station was then separated by hour of the day, wind direction, and wind speed at a 10 m height into the following groupings:

Hour periods: 0-700, 800-1500, 1600-2300
Wind Direction: 20 degrees increments
Wind speed periods (mph): 0-3. 3-6, 6-9, 9-12, 12-15, 15-18, 18+

Data was then averaged in each group. Averaging of similar data allows the model to create sample sizes greater than 1 to reduce the effect of outliers. The averaged data created a representative dataset of meteorological and PM10 concentration data to be utilized for emission footprint creation.

Estimation of Emissions Origination Area

Characterization of the land uses contributing to emissions impacting the monitor requires the estimation of the area from which the emissions originate. Back trajectories were considered for this purpose; however, the use of back trajectories does not account for particle deposition rates. In order to account for this, emission footprints were estimated using the EdiTools program known as "Footprint" *(http://www.geos.ed.ac.uk/abs/research/micromet/EdiTools/).* Footprint creates an image representative of the measurement site of interest dependent on the meteorological characteristics input into the model. This image can then be imported into ArcGIS for characterization contributing land uses. The Footprint model is a windows desktop implementation of the Korman and Meixner analytical footprint model (2001). This model accounts for vertical turbulence and cross-wind dispersion in order to back calculate particle motion based on a range of meteorological inputs such as: wind speed, wind direction, distance to obstructions, air temperature, sensible heat flux, mixing height, and surrounding vegetation canopy density and height. The model originates from the advection/diffusion equation but has shown good agreement with a Lagrangian stochastic particle dispersion model (Kljun *et al.* 2003).

The following information was utilized for creation of footprints for the modeling of the PCH 1/1/2008 design day:

- "Map X/Y dimension, meters" is the distance from the station to the nearest large obstruction (i.e. hill, mountain, etc) in the direction from which the wind flow originates, which was determined from aerial photography of the region to be approximately 15 km for each of the monitors,
- "Maximum Fetch" was determined by the length of the footprint,
- "Measurement height" was set to the height at which the PM10 concentration measurements were taken and varied for each monitor,
- "Canopy Height" was estimated as 0.6m,
- "Canopy Area Density" was estimated as 1.0,
- "Boundary Layer Depth" is the average mixing height estimated by AERMET,
- "Sensible Heat Flux" was estimated by AERMET,
- "Air Temperature" was estimated to hourly averages for the season based on AZMET data from 2008,
- "Wind Speed" was obtained from field measurements at the monitors,
- "Wind Direction" was obtained from field measurements at the monitors,
- And the "Brightness distribution footprint boundary, %" was set to 90% to estimate the origination area of 90% of the emissions.

A single emission estimation origination footprint was created for each EF needed to model the January 1, 2008 proposed design day for PCH. For each unique wind speed and hour of day grouping it was necessary to create 9 footprints. Each of these footprints contained a unique land use type so that EFs could be created for all 9 land use types for

each wind speed/hour of day grouping. The total number of footprints created for the testing of the PCH 1/1/2008 design day was 80.

ArcGIS Data Integration

The next step of the method utilized ArcGIS (Esri) to plot each footprint and to determine the boundaries for each land use within a given footprint. Images created during the Footprint processing portion of the method were loaded into ArcGIS. The receptor (i.e. PM_{10} monitor) on each footprint was geo-rectified to match the physical location of the monitor station of interest and the scale of the footprints were adjusted to match that of the land use data layer. New polygons were created to outline the footprint boundary. When necessary, these polygons were clipped to insure the extent of the footprint did not exceed the distance a parcel of air could travel in an hour. The land use polygon was then clipped to the boundary of the individual footprint polygons to create a land use polygon unique to each footprint polygon. Land use areas and road lengths were then calculated in ArcGIS. Road width was utilized to estimate road area for unpaved and paved roadways.

Statistical Optimization of EFs

The final step of the emission factor back calculation process involves data consolidation and statistical optimization in order to estimate the EFs for each land use. For each footprint, the total area of each land use type was summed in ArcGIS. After calculating the total land use area for each footprint, the data was compiled in MS Excel. For the optimization process each land use must be contained within at least one unique footprint.

Following the consolidation of data, the emissions from the total footprint must be calculated from the field PM_{10} average concentrations for the period of interest. Daily average emissions at the station are calculated using the following equation:

$$E = \frac{A_{FP} * H_M * C}{907{,}184{,}740{,}000}$$

where E is the average emissions captured by the station [tons], A_{FP} is the area of the emissions origination footprint [m^2], H_M is the atmospheric mixing height [m], C is the average hourly measured PM_{10} concentration [$\mu g/m^3$], and 907,184,740,000 is the conversion factor from micrograms to tons. Once this has been calculated for each footprint, an E_{80} or E_{90} can be calculated so 80% or 90% of the total emissions can be attributed to the 80% or 90% footprint (percentage is dependant on which footprint size reasonably fit within the boundaries of the Footprint model boundaries):

$$E_{80} = 0.8 * E \text{ or } E_{90} = 0.9 * E$$

The final step requires the use of statistical optimization in order to simultaneously back calculate all 9 EFs for each wind speed/diurnal temporal grouping. In order to complete this process, the Excel Addin - Solver was utilized to apply the Newton Method. Solver

was set up to simultaneously calculate all EFs and the difference between the calculated PM10 concentrations using those EFs for each footprint and the field measured PM10 concentrations for each footprint (this value is known as the Error). Solver was then instructed to minimize the sum of the individual Errors squared for all footprints. Using this method, Solver determined the most appropriate EF values for each land use across all footprints in order to minimize Error using the equation:

$$\sum_{x=a}^{o} A_x * EF_x + \varepsilon$$

where A_x is a given land use Area, EF_x is the estimated Emission Factor of land use x, and ε is the Error associated with the footprint of interest.

After the creation of individual EFs for all land uses at all wind speeds for the 3 periods of the day, wind blown EFs were determined by subtracting low wind EFs (i.e. 0-3 mph winds) from all higher wind speed emission factors (i.e. 3-6, 6-9, 9-12, 12-15, 15-18, and 18+ mph) for all 9 land uses during each of the 3 temporal periods of the day (0-700, 800-1500, and 1600-2300 hours). By doing so, activity driven emissions could be separated from wind blown emissions in order to adequately calculate EFs which were only dependant on emissions originating from windblown PM_{10} entrainment.

Design Day Modeling

Due to time constraints, modeling using AERMOD could not be performed to test the validity of the back calculated EFs. Therefore, a simplified model was utilized to test the accuracy of the estimated EFs. Model validity was tested using the EFs estimated for each land use by the EFBC method and applying the appropriate EFs to each hour of the design day. Since PM_{10} entrainment originating from stagnation activities were unknown, estimated EFs created prior to the wind blown correction were utilized in this testing in order to account for unknown stagnation emissions as well. Testing was achieved by using the meteorological data for each hour of the January 1st proposed PCH design day to create 24 unique emission origination footprints using the EdiRe Footprint program. These footprints represented the estimated origination area of 90% of the emissions impacting the station for a given hour of the design day. These 24 footprints were used in the same method described on the "*ArcGIS Data Integration*" section to determine the total land use area contributing emissions for each hour of the day. Each hour was modeled separately, multiplying EFs by the corresponding land use area to determine the emissions from each land use type and then summing all land use emissions for the hour. Total emissions were then converted to PM_{10} atmospheric concentrations to compare to monitor measured concentrations on the design day by modifying the equation:

$$E = \frac{A_{FP} * H_M * C}{907{,}184{,}740{,}000}$$

to calculate for C, whereby:

$$C = \frac{907{,}184{,}740{,}000 * E}{A_{FP} * H_M}$$

The variables *A* and *H* were based on the hourly measurements specific to the design day being tested. Hourly calculated concentrations were then compared to PM_{10} concentrations measured at the monitor for the design day.

RESULTS

EF Estimation

The EFBC method relies upon adequate characterization and classification of emission contributing lands into discrete categories. For the purposes of the initial test of this method, land uses were classified into 9 categories. Table 1 gives a description of each of these Land Use (LU) codes. These LU codes will be used in subsequent graphs and tables.

Table 1: Land use code categories

Landuse Code	Description
A	Developed Urban Lands
B	Developed Rural Lands (low density residential)
C	Paved Roads
D	Unpaved Roads
E	Cleared Areas
F	Construction Area
G	CAFOs and Dairies
H	Desert Shrubland
I&J	Fallow and Active Crop Fields

For the purposes of creating the necessary EFs for all land uses during the PCH January 1, 2008 design day, nine wind speed/period of day combinations were required. Table 2 shows these combinations. For instance, on January 1stfor 000-700 hours winds speeds between 0-3 mph and 3-6 mph were registered at the PCH monitor, but no wind speeds higher than this were registered during this timeframe. Therefore, EFs were developed for these 2 wind speed bins, but not for any higher wind speeds for this time of day. Altogether, Table 2 gives 80 estimated EFs for 9 LUs as determined using the EFBC methodology. These EFs were estimated during the winter period of 2008 (Dec 21 – Mar 20). These EFs have not been corrected to remove stagnation, activity driven emissions. An emission factor for land use G (CAFOs and Dairies) could not be determined for the winter of 2008 for wind speeds over 18 mph at a 10m height between the hours of 1600 and 2300 due to lack of available data. This EF was not necessary to test the PCH 1/1/2008 proposed design day.

Table 2: Estimated EFs [tons/m^2/hr] for different wind speeds and times of the day for the winter months of 2008. These EFs were calculated using the EF back calculation (EFBC) model. These EFs include emissions originating from stagnation activities.

LU ID	A	B	C	D	E	F	G	H	I&J
0-3mph 000-700hrs	5.45E-10	1.87E-10	1.18E-10	3.14E-11	2.07E-10	6.43E-10	2.45E-09	7.68E-10	1.37E-09
0-3mph 800-1500hrs	6.70E-09	2.94E-10	3.13E-08	5.73E-11	7.13E-11	2.89E-08	4.84E-10	2.58E-10	2.33E-09
0-3mph 1600-2300hrs	2.10E-10	1.41E-10	5.09E-11	7.12E-11	1.59E-10	5.32E-11	6.44E-08	6.86E-10	6.39E-09
3-6mph 000-700hrs	1.44E-09	1.36E-09	3.53E-10	1.60E-10	1.21E-09	2.34E-10	1.62E-10	1.97E-09	2.00E-09
3-6mph 800-1500hrs	1.32E-09	9.49E-10	1.73E-10	7.34E-11	1.84E-10	1.88E-10	2.35E-09	5.25E-10	1.63E-09
15-18mph 800-1500hrs	7.39E-07	4.57E-07	1.04E-07	4.23E-08	2.29E-08	8.48E-09	1.57E-09	7.58E-07	3.28E-08
15-18mph 1600-2300hrs	1.65E-07	1.45E-07	3.70E-08	9.63E-09	3.40E-08	5.67E-08	2.02E-09	1.75E-07	1.80E-07
18+mph 800-1500hrs	5.93E-07	1.09E-06	1.87E-07	1.12E-07	5.13E-07	1.21E-08	4.36E-10	2.07E-06	1.21E-06
18+mph 1600-2300hrs	1.35E-08	1.11E-07	2.33E-07	1.67E-07	3.95E-06	1.48E-06	NA	6.60E-08	2.36E-07

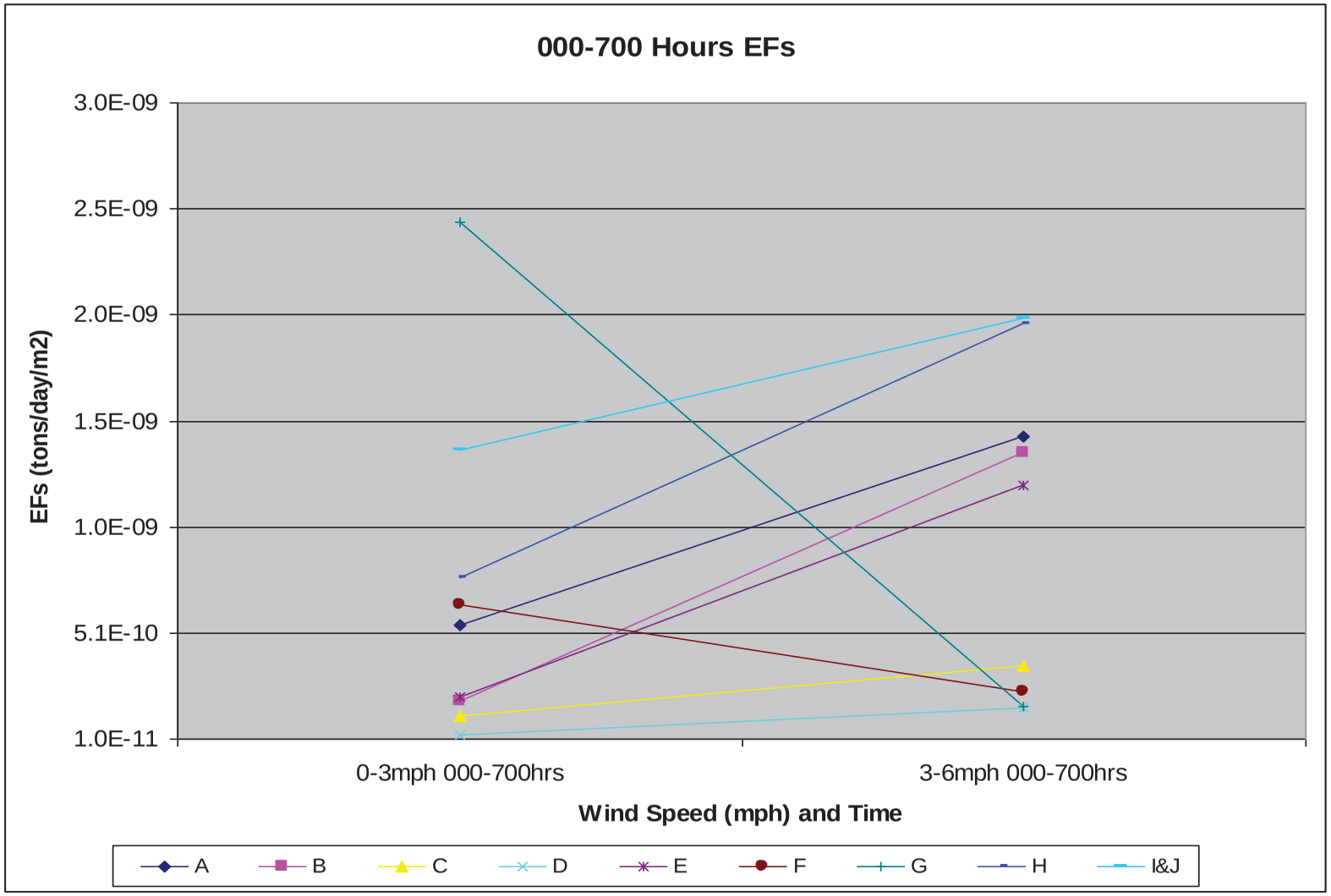


Figure 1: Estimated Winter Emission Factors [tons/m2/hour] for all land uses between 0-700 hours for the wind speed categories of 0-3 mph and 3-6 mph. Wind speeds were adjusted for a 10m height.

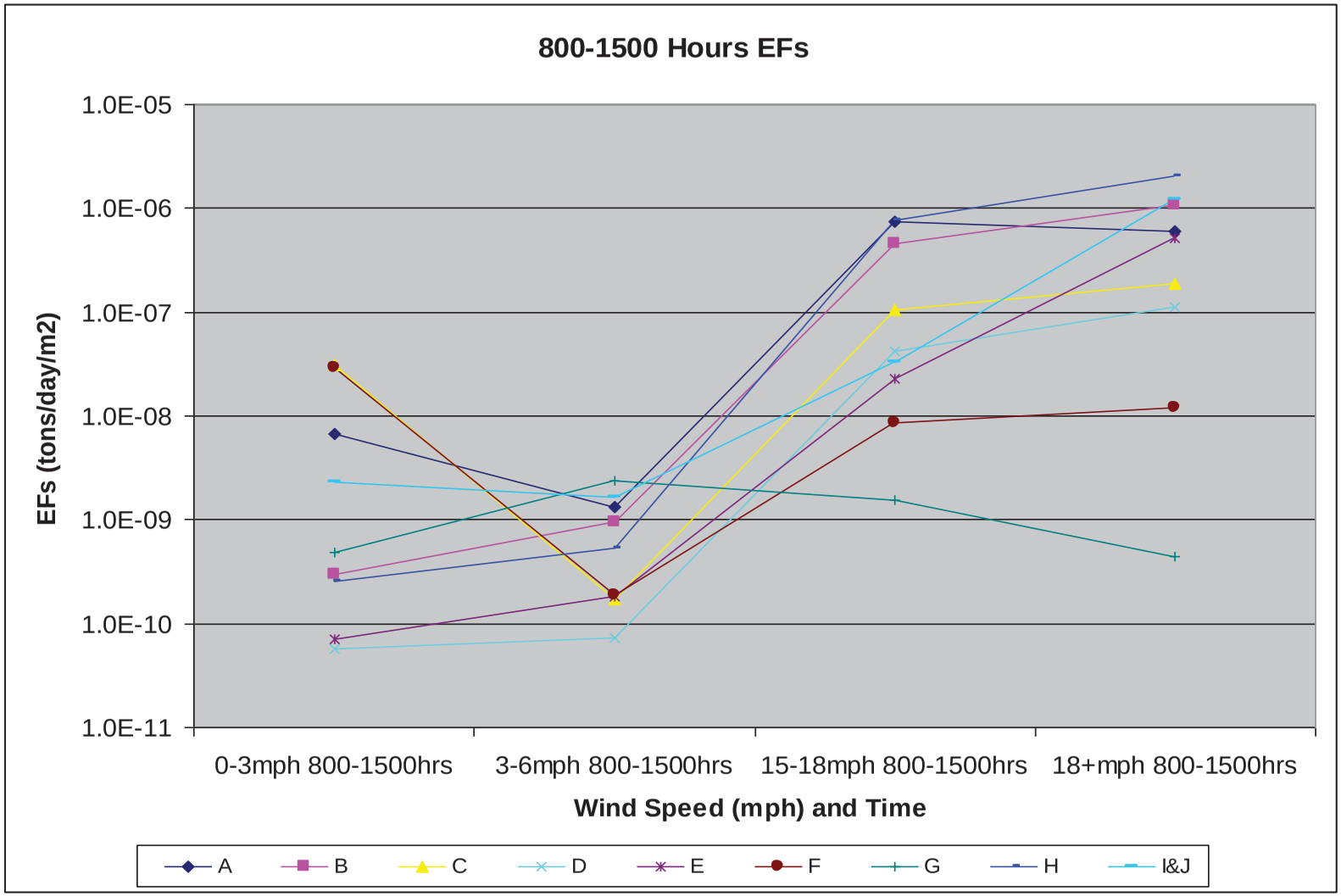


Figure 2: Estimated Winter Emission Factors [tons/m2/hour] for all land uses between 800-1500 hours for the wind speed categories of 0-3 mph, 3-6 mph, 15-18 mph, and 18+ mph. Wind speeds were adjusted for a 10m height.

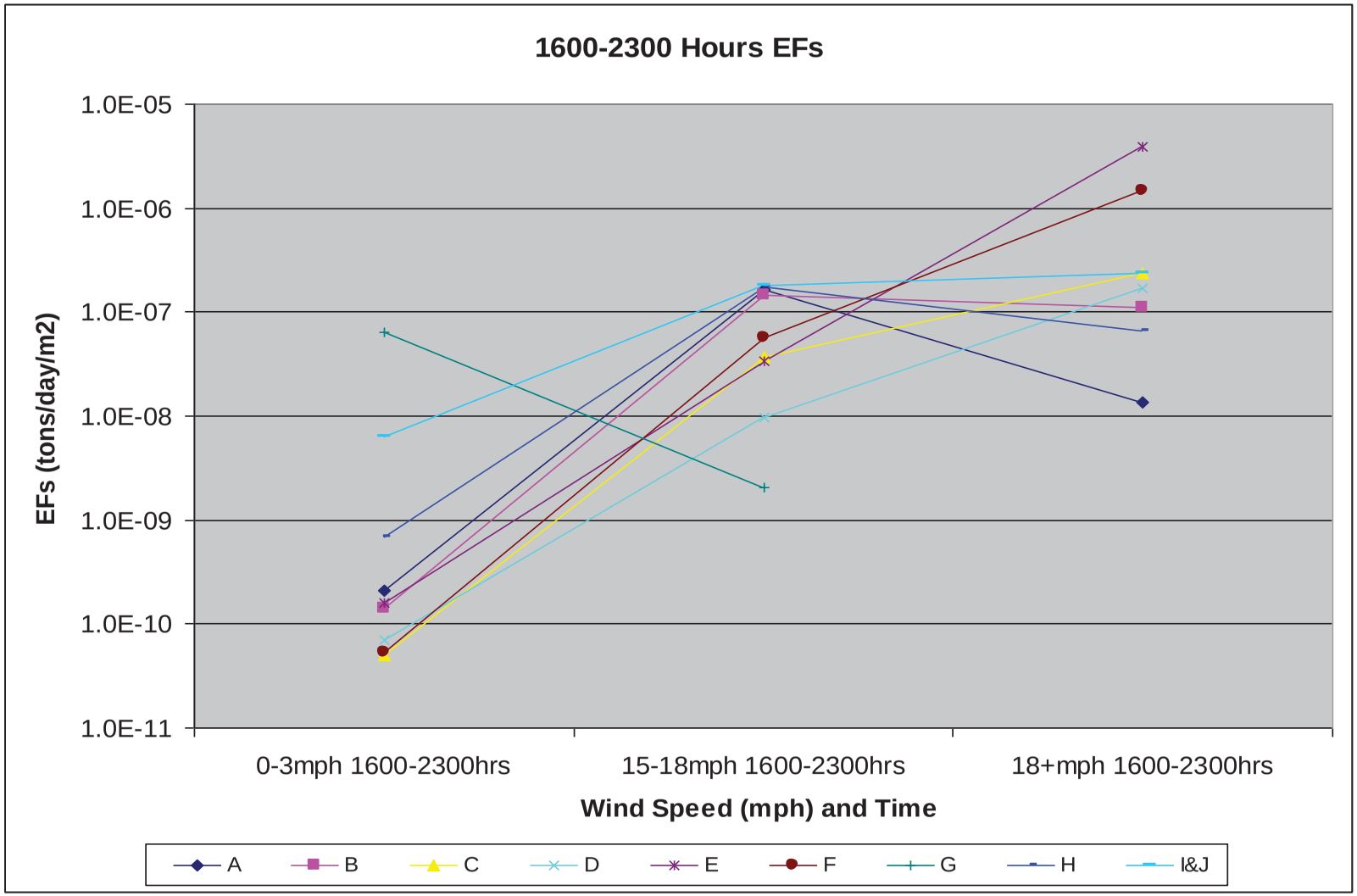


Figure 3: Estimated Winter Emission Factors [tons/m2/hour] for all land uses between 1600-2300 hours for the wind speed categories of 0-3 mph, 15-18 mph, and 18+ mph. Wind speeds were adjusted for a 10m height.

Figures 1-3 show how these estimated EFs change with varying wind speeds for the three periods of the day for which they were calculated (0-700 hours, 800-1500 hours, and 1600-2300hours). CAFOs and Dairies (Land Use type G) is the only land use which showed decreasing emission rates with increasing wind speeds. This could be attributed to cattle movement patterns. As wind speeds increase, especially into extreme speeds such as 15+ mph, cattle may be less likely to move around which would reduce mechanical entrainment not related to windblown emissions. During the early and late hours of the day, Croplands and CAFOs have the highest EFs under stagnation conditions, likely due to the increased activity on these lands in comparison to other land uses at the same time of day. During the mid-hours of the day, construction areas, paved roads, and urban developed lands have much higher stagnation related emission rates. This is also attributable to the increased activity on these lands during the middle portion of the day for winter months.

The next step in the windblown EF estimation process was to correct the EFs listed above for stagnation, activity driven emissions. In order to do so, EFs for wind speeds less than 3 mph were subtracted from wind speeds greater than 3 mph. In this way, windblown EFs were created through the removal of activity driven emissions. Land uses which exhibited decreasing emission factors with increasing wind speeds were assumed to have negligible emissions originating from wind and were thus given wind blown EFs of 0 tons/m^2/hour. Table 3 presents wind blown EFs after correcting for stagnation, activity driven emissions.

For the early hours of the day (000-700 hours) low speeds (i.e. 0-3 mph) exhibited the highest windblown EFs for Desert Shrublands, Developed Rural Lands, and Cleared Areas followed by Developed Urban Lands and Crop Fields. The first 3 land use types are likely to have large reservoirs for PM_{10} entrainment with the possibility of being highly disturbed. Developed Urban Lands and a majority of Crop Fields are going to have a high degree of land coverage to reduce emission factors.

For all hours of the day, as wind speeds increase Desert Shrubland EFs increase with the exception of the late hours of the day. As wind speeds transition from 15-18 mph to 18+ mph Desert Shrubland EFs decrease slightly which could be an artifact of reservoir depletion in the late hours of the day. In fact, 3 of the 4 instances where EFs decreased when transitioning from 15-18 mph to 18+ mph for a given land use occurred in the later hours of the day (1600-2300 hours), indicating reservoir depletion may in fact be playing a significant role. Cleared Areas and Crop Fields showed drastic increases in EFs during the middle of the day (800-1500 hours) with increasing wind speed, while in the late hours of the day (1600-2300 hours) Unpaved Roads, Cleared Areas, and Construction Areas showed the greatest increases in emission factors with increasing wind speed. Developed Urban and Rural Lands had consistently high EFs as did Paved Roads. The elevated Developed Urban Lands and Paved Road EFs were surprising due to the degree to which these land uses have coverage to reduce the reservoir size.

Table 3: Estimated wind blown EFs [tons/m^2/hr] for different wind speeds and times of the day for the winter months of 2008. These EFs were calculated using the EF back calculation model, and were corrected to remove stagnation activities.

LU ID	A	B	C	D	E	F	G	H	I&J
3-6mph 000-700hrs	8.91E-10	1.17E-09	2.35E-10	1.28E-10	1.00E-09	0.00E+00	0.00E+00	1.20E-09	6.26E-10
3-6mph 800-1500hrs	0.00E+00	6.55E-10	0.00E+00	1.61E-11	1.13E-10	0.00E+00	1.86E-09	2.66E-10	0.00E+00
15-18mph 800-1500hrs	7.32E-07	4.57E-07	7.28E-08	4.22E-08	2.29E-08	0.00E+00	1.08E-09	7.58E-07	3.05E-08
15-18mph 1600-2300hrs	1.65E-07	1.45E-07	3.69E-08	9.56E-09	3.39E-08	5.67E-08	0.00E+00	1.75E-07	1.74E-07
18+mph 800-1500hrs	5.86E-07	1.09E-06	1.55E-07	1.12E-07	5.13E-07	0.00E+00	0.00E+00	2.07E-06	1.21E-06
18+mph 1600-2300hrs	1.33E-08	1.11E-07	2.33E-07	1.67E-07	3.95E-06	1.48E-06	0.00E+00	6.53E-08	2.30E-07

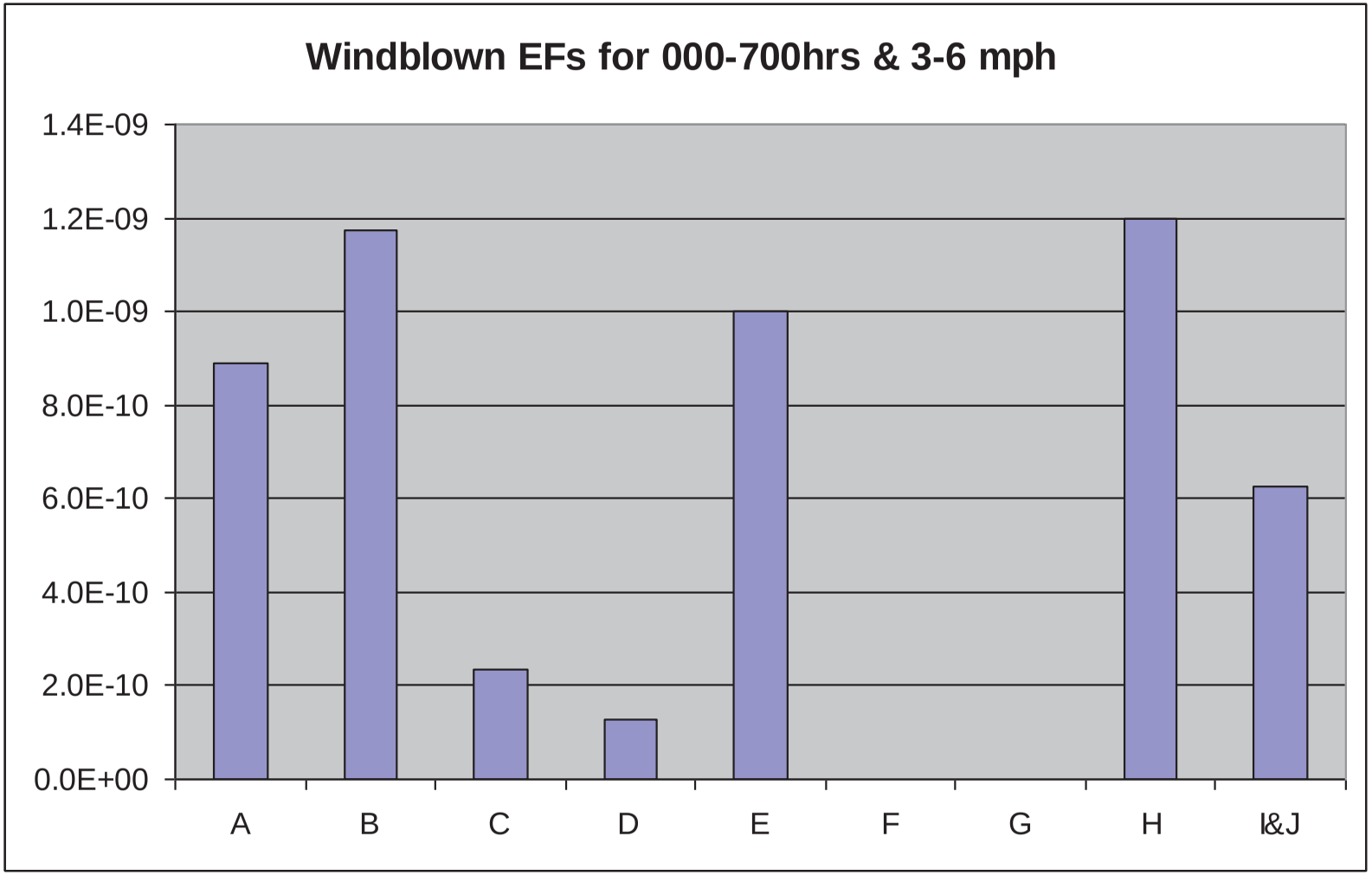


Figure 4: Estimated Winter Windblown Emission Factors [tons/m2/hour] for all land uses between 0-700 hours for the wind speed category of 3-6 mph. Wind speeds were adjusted for a 10m height. These EFs were corrected for stagnation, activity driven emissions.

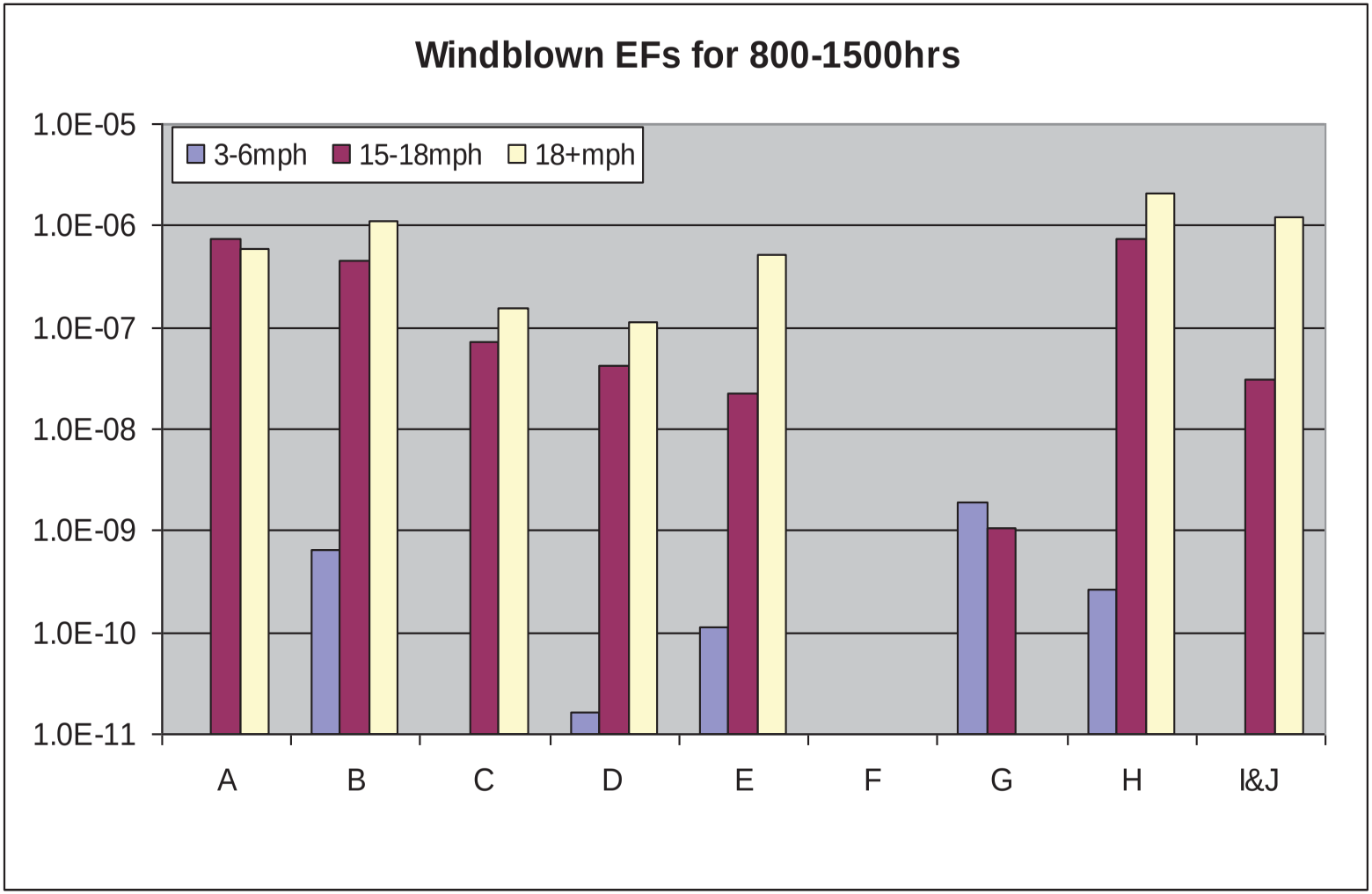


Figure 5: Estimated Winter Windblown Emission Factors [tons/m2/hour] for all land uses between 800-1500 hours for the wind speed categories of 3-6 mph, 15-18 mph, and 18+ mph. Wind speeds were adjusted for a 10m height. These EFs were corrected for stagnation, activity driven emissions.

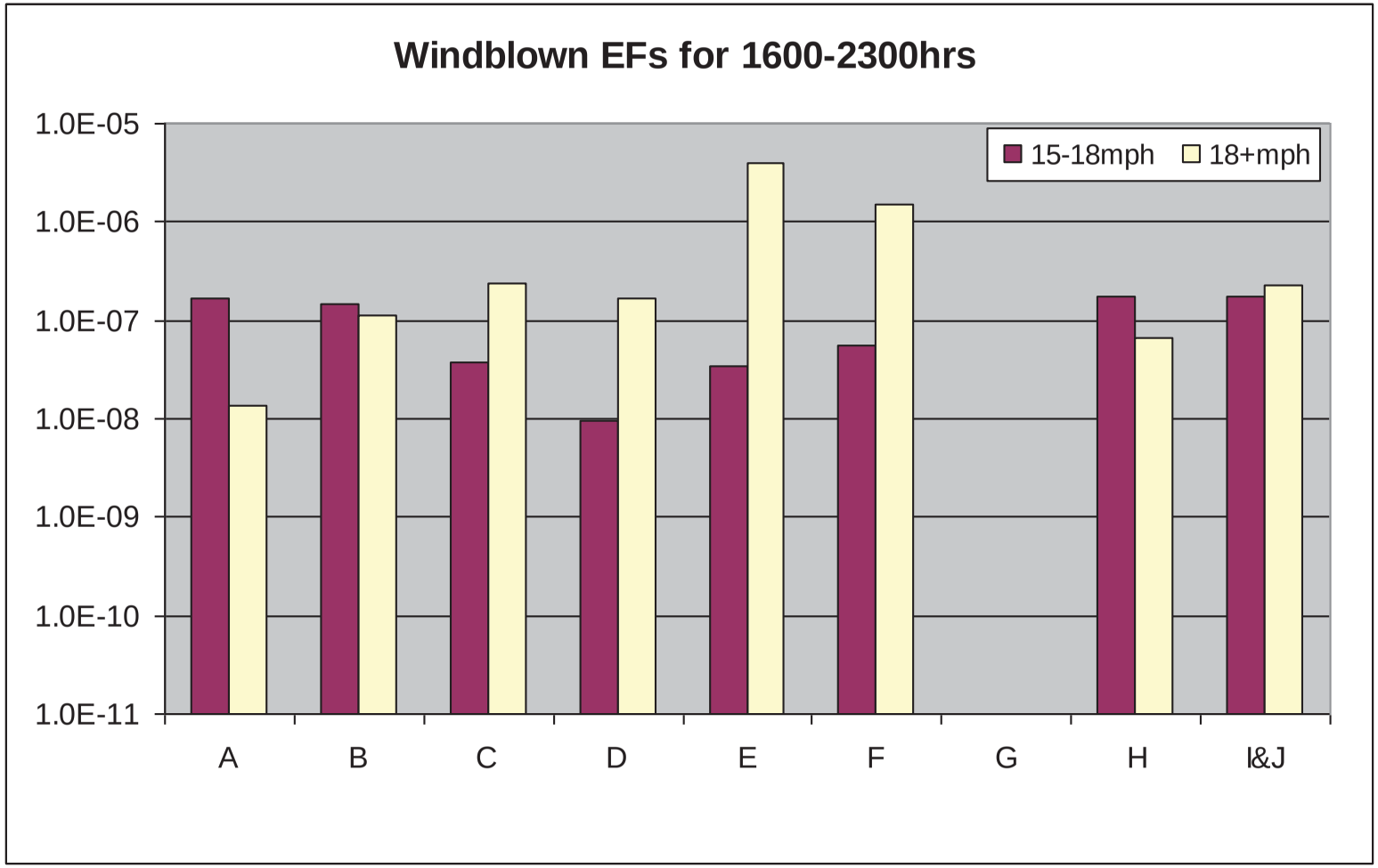


Figure 6: Estimated Winter Windblown Emission Factors [tons/m2/hour] for all land uses between 1600-2300 hours for the wind speed categories of 15-18 mph and 18+ mph. Wind speeds were adjusted for a 10m height. These EFs were corrected for stagnation, activity driven emissions.

EF estimation Variability and Error

The EF back calculation method attempts to minimize data variability by grouping similar wind speeds, wind directions, hours of the day, and only utilizing data from the season of interest on dates where rainfall was less than 2 mm. However, natural variability will still occur in emissions data due to soil texture variability within the modeled region; reservoir depletion over consecutive high wind hours; variability in soil moisture over the modeled region; variability in stagnation, activity related emissions; etc. This variability is reflected in Table 3. Table 3 presents the error matrix which calculates the percent error for each footprint when back calculating the EFs for each wind speed/diurnal temporal grouping (separated by rows in the table). This error was calculated using the following equation:

$$\%\varepsilon = \frac{\left(E - |\varepsilon|\right)}{E}$$

where E is the field measured emissions [tons/hour] and $|\varepsilon|$ is the absolute value of the error from the previously mentioned equation:

$$\sum_{x=a}^{o} A_x * EF_x + \varepsilon$$

The variability in this error accentuates the variability which can be seen in field measured PM10 concentrations under similar meteorological conditions.

Table 3: This error matrix shows the percent errors associated with each footprint during the back calculation portion for determining EFs. Positive errors indicate that the measured field PM10 concentrations are larger than the errors for that footprint during statistical optimization. Negative errors indicate that the measured field PM10 concentrations are larger than the errors for that footprint during statistical optimization. Strongly negative values show poor correlation resulting from highly variable data. Only 8 footprints were calculated for the last row of data since CAFOs and Dairies were not found to contribute during any hours with these meteorological characteristics.

EF Back Calculation Error Matrix (%)									
	1	2	3	4	5	6	7	8	9
0-3mph 000-700hrs	72	102	-51	-63	105	119	23	-131	124
0-3mph 800-1500hrs	198	179	197	156	198	198	98	95	100
0-3mph 1600-2300hrs	-108	25	-245	-704	-573	124	116	71	-25
3-6mph 000-700hrs	83	88	-239	-66	69	70	91	100	88
3-6mph 800-1500hrs	116	98	23	124	15	100	-149	-140	100
15-18mph 800-1500hrs	86	-335	-1862	-251	-1594	-575	-2297	-890	-3447
15-18mph 1600-2300hrs	-449	-191	34	-125	-155	-2937	-523	-322	-252
18+mph 800-1500hrs	48	-3601	93	-3519	-2673	-1240	-3693	-1543	-33
18+mph 1600-2300hrs	-133	40	-388	-333	100	-1	-2755	-17271	

Design Day Modeling

The estimated EFs for the winter of 2008 presented in Table 2 were used to test how well total hourly estimated PM10 concentrations using a simplified modeling approach would compare to field measured PM10 concentrations for the Pinal County Housing design day of January 1, 2008. Wind blown EFs could not be used since activity driven emissions from the January 1st design day had not yet been determined. Therefore, uncorrected emission factors (i.e. EFs which account for stagnation, activity driven emissions as well as wind blown emissions) were utilized in testing the model performance against field measured PM10 concentrations. Figure 7 presents this comparison and shows fairly good model results against field measured values. Modeled peak PM10 concentrations are delayed by 3 hours in comparison to field measured data; however, the overall trend is captured and for most hours of the day there is only a small amount of error between field measured and model estimated PM_{10} atmospheric concentrations. The average hourly error throughout the day is 97%, as calculated by the equation:

$$\%Difference = \frac{\left|C_{Model} - C_{Measured}\right|}{C_{Measured}}$$

Where C_{Model} is the PM_{10} concentration which was modeled ($\mu g/m^3$) and $C_{Measured}$ is the PM_{10} concentration ($\mu g/m^3$) measured at the monitor for that hour of the design day. The model performed very well at the daily scale. PCAQD reported a 24 hour PM_{10} concentration for PCH on 1/1/2008 of 264.9 $\mu g/m^3$ and the model predicted a 24 hour average concentration of 260.4 $\mu g/m^3$. The estimated 24 hour average was calculated by averaging each of the individual 24 hourly estimated PM_{10} concentrations, where:

$$C_{24} = \frac{\sum_{h=100}^{2400} C_h}{24}$$

C_{24} is the average 24 hour concentration ($\mu g/m^3$) and C_h ($\mu g/m^3$) is the estimated PM_{10} concentration for each of the 24 estimated hourly concentrations.

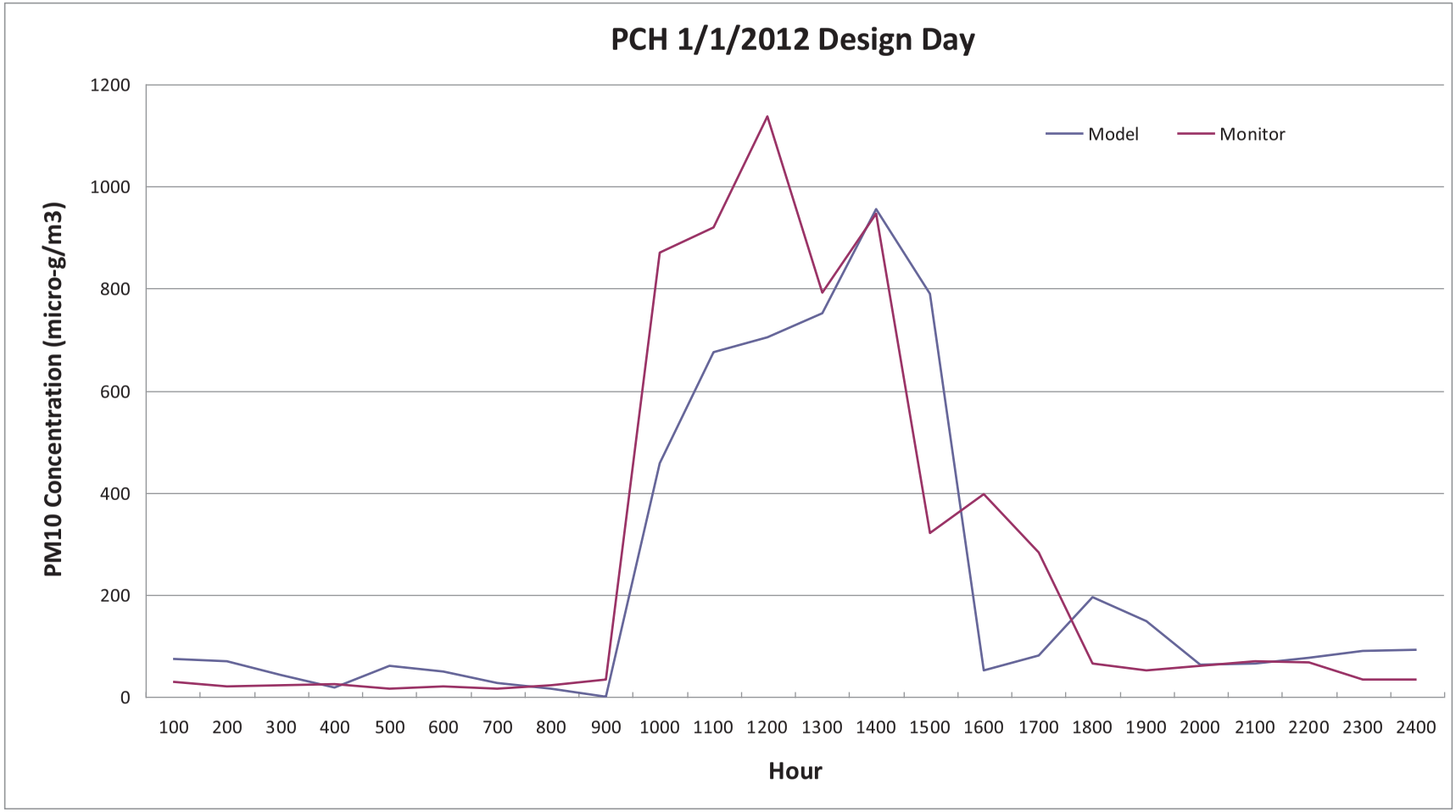


Figure 7: A comparison of field measured PM10 concentrations (Monitor) against PM10 concentrations predicted using EFs estimated by the back calculation method (Model) for each hour of the 1/1/2008 PCH design day.

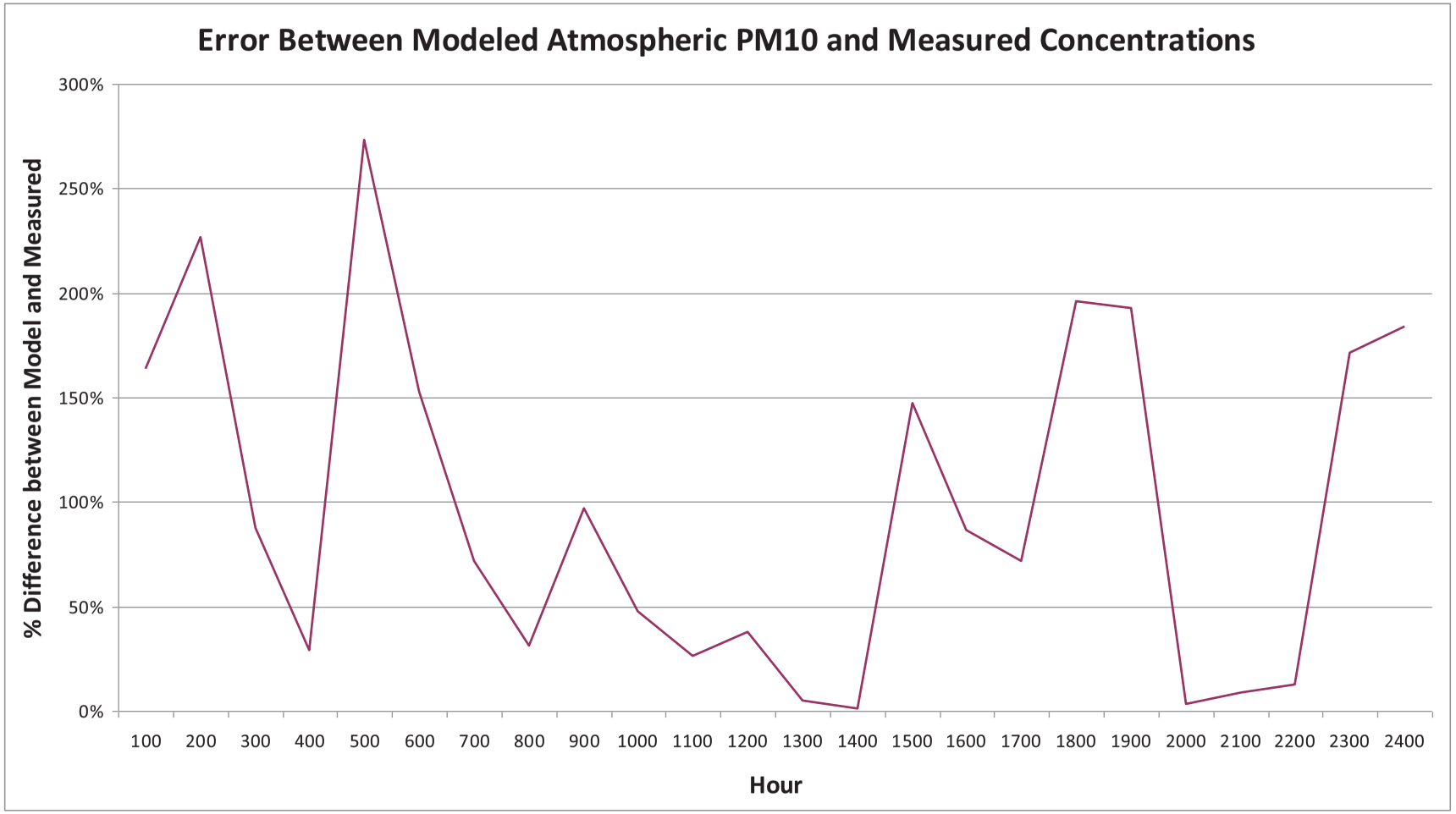


Figure 8: Calculated Difference between modeled and measured atmospheric PM_{10} concentrations for each hour of the PCH 1/1/2008 design day.

DISCUSSION

The EF Back Calculation Method utilizes field measured PM10 concentrations and meteorological data in an attempt to accurately estimate EFs for a variety of land use types within a given area. The estimated EFs using this method are specific to the area for which the model is run. This is preferential to literature reported EFs which may be calculated in an environment uniquely different from the modeled area. Pinal County is a region of high soil disturbance, low annual rainfall, and low surface friction due to a lack of vegetative cover. For these reasons, EFs specific to the region were needed and the EFBC method was employed. In this document, the methodology behind the EF back calculation method is presented. In addition, the resulting estimated EFs from a test run were utilized in a simplified model to gauge the accuracy of these EFs for one of the design days proposed for modeling in the Pinal County State Implementation Plan. The EFBC method provided some individual EFs which were counter intuitive, such as EFs from paved and unpaved roads being comparable. These issues could be due to statistical optimization problems with these land use types due to the small relative area they exhibit in relation to other land use types used in the model. This could also be due to incorrect characterization of land uses, requiring a review of the land use classification layers used for the model. Despite these issues, when the EFBC estimated EFs were modeled for the PCH January 1, 2008 design day, the results exhibited good agreement with field measured PM_{10} concentrations at the hourly scale and excellent agreement at the daily scale (i.e. 24 hour average PM_{10} concentrations) using a simplified modeling approach. Further work will need to be done to test validity of these estimated EFs in an EPA approved model such as AERMOD. The use of AERMOD will provide a different modeling domain than that used in the simplified modeling approach presented in this paper as well as account for deposition and dispersion effects on the modeling domain not directly accounted for in the simplified approach presented above. However, the preliminary results presented in the model above using EFs estimated by the EFBC method indicate this method represents a reasonable way to estimate area specific EFs from field measured meteorological and PM10 concentration data for PM_{10} concentration modeling. While WRAP or AP-42 regionally or nationally based EF values and equations present more generalized values, this method allows the user to specify the land use types of interest and develop EFs originating from locally sampled data.

REFERENCES

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Appendix J

MAG 2012 Five Percent Plan for PM10 for the
Maricopa County Nonattainment Area
May 2012

INVENTORY DEVELOPMENT

Under a rollback modeling scheme, reductions of emissions that impact the monitor are assumed to result in an equal reduction in monitor concentrations. As such, both base case (2007) low and high wind inventories must be developed along with control case (2012) low and high wind inventories. This following describes in detail how the 2007 base year and 2012 control/attainment year high and low wind inventories were developed. Details on how the base and attainment year inventories are developed for the entire nonattainment area are presented in Chapters II and III of this TSD.

High Wind Inventories

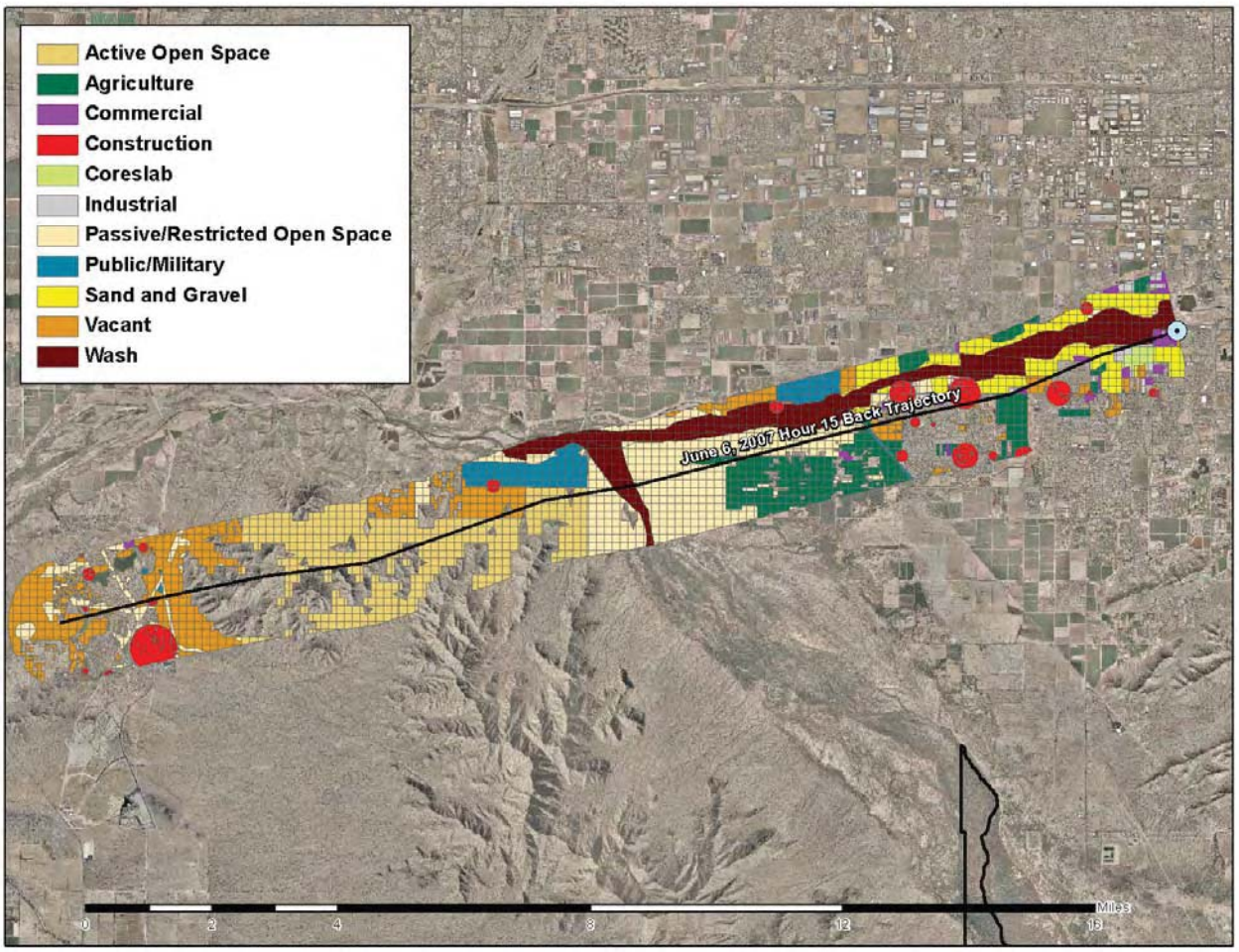
For the high wind hours, hourly windblown PM-10 emissions are calculated based upon the land uses that fall within each of the hourly high wind domains. Land use data, with the exception of construction data, comes from the MAG information services and represents land use patterns as of 2009. Land use is held constant between calculation of 2007 and 2012 year inventories. A detailed write-up of how the land use data is created is included in the 2008 PM-10 Periodic Emissions Inventory as an Appendix to the windblown dust section. Construction data was provided by the Maricopa County Air Quality Department for the year 2007. To be conservative this data is also held constant through 2012 even though there is substantially less construction occurring due to the economic recession. Windblown PM-10 emissions for the subject land uses are calculated per the methodology described in the 2008 PM-10 Periodic Emissions Inventory (Appendix A, Exhibit 1). As an example, emissions from the West 43rd Avenue monitor hour 15 high wind domain (June 6, 2007 design day) are explained below. All of the hourly high wind emissions are calculated in the same manner shown in this example.

Initially, through the use of ArcGIS, the land uses subject to windblown dust emissions within the high wind domain are identified. For the hour 15 example, 11 unique land uses within the high wind domain are subject to windblown dust as shown in Figure V-16. They include the land uses of Active Open Space (i.e., parks), Agriculture, Commercial, Construction, Coreslab (a large combination of sand and gravel and industrial facility), Industrial, Passive/Restricted Open Space (i.e., preserves), Public/Military Space (i.e., jails, bases), Sand and Gravel facilities, Vacant, and Dry Washes. These land uses are chosen because either all or some of their acreage is bare soil from which windblown dust can be generated. Land uses such as residential or golf courses are not included as land uses subject to windblown dust since none (or a very limited amount) of the acreage associated with these land uses is bare soil. Land uses on the steep slopes of mountain preserves are also excluded as the surface roughness of the slope severely limits the production of windblown dust.

After the land uses are identified, a 10-acre fishnet grid is applied to the land uses, so that no individual land use parcel is larger than ten acres. This allows for calculating the distance from each parcel boundary to the modeled monitor; which is West 43rd Avenue in this example. The distance of the parcel to the monitor is necessary in order to apply

the distance weighting factor to the calculated emissions as discussed earlier in this chapter.

Figure V-16
Land Uses Capable of Producing Windblown Dust Within the Hour 15, West 43rd Avenue Monitor, High Wind Domain (June 6, 2007)



To be conservative, all but four of the land uses shown above are assumed to have 100% of their acreage capable of emitting windblown dust. The land uses of Commercial, Coreslab, Industrial and Public/Military are exempted from this assumption because these land uses are known to have a mix of large buildings and paved parking lots/access roads in addition to areas of bare soil. Over 2500 aerial photographs of these types of parcels in the Salt River area were evaluated to determine the average percentage of bare soil present on each of these land uses. The results of that analysis are listed in Table V-22. To be conservative, the mean value was chosen to represent the average percentage of bare soil on these land uses, as this value was higher than the median in all cases. Note that Coreslab is considered an industrial parcel, and as such is assigned the average of 24% for the amount of bare soil present.

Table V-22
Results of Aerial Photography Analysis of Percentage of Bare Soil on Land Uses with Both Bare and Covered Surfaces

Land Use	Mean	Median	Std. Deviation
Commercial	26%	20%	23%
Industrial	24%	17%	21%
Public/Military	35%	21%	35%

After the land uses within the high wind domain have been classified and selected, the process for calculating windblown emissions from these land uses can begin. The 2008 PM-10 Periodic Emissions Inventory developed emission factors for two classes of bare soil: disturbed and stable. Disturbed soils emit at a much higher rate than stabilized soils because there is more loose soil available to be entrained by the wind. As wind speeds increase, both disturbed and stable soils emit at higher rates, as the extra energy from the wind entrains more material from both surfaces. Thus, the main elements needed to calculate windblown PM-10 emissions are the number of acres of bare soil, the wind speeds over that soil, and the percentage of the acres that are disturbed or stable.

Table V-23 displays the emission factors by wind speed bins as developed in the 2008 Periodic Emissions Inventory. These emission factors were developed based upon local testing of Arizona soils. The units of the emission factors are tons per acre per five-minute, as the input wind speed data for most of the high wind domains is a five-minute average wind speed.

Table V-23
Windblown PM-10 Emission Factors (tons /acre-five-minute) by 10-Meter Wind Speed Bin and Soil Stabilization

Soil Stabilization	Wind Speed 12-15 mph	Wind Speed 15-20 mph	Wind Speed 20-25 mph	Wind Speed 25-30 mph	Wind Speed 30-35 mph
Disturbed	5.44E-05	1.69E-04	5.14E-04	1.24E-03	2.57E-03
Stable	1.10E-05	2.93E-05	7.68E-05	1.64E-04	3.10E-04

Continuing with the use of the hour 15, West 43rd Avenue, high wind domain example, the hourly average wind speed for that hour was 18.1 mph. An examination of the five-minute wind speed data for that hour reveals that ten of the five minute periods had wind speeds between 15-20 mph and two of the five minute periods had wind speeds between 20-25 mph. This means that the emissions factors from only two wind speed bins (15-20 and 20-25) will be used to calculate emissions for this hour.

At this point, the amount of acreage by land use and the five minute wind speeds have been determined for the example high wind domain. The one variable that is left to be

determined is how much of the land use acreage is disturbed or stable. A direct measurement of this variable is not possible, as stabilization rates change over time with meteorological and anthropogenic activities unique to each individual parcel. Therefore, a surrogate variable is needed to assume an average disturbance level for each land use subject to producing windblown dust. As discussed in Chapter Five of the main plan and the 2008 PM-10 Periodic Emissions Inventory, rule effectiveness has been chosen as the surrogate for the disturbance levels of bare soils. As an example, a rule effectiveness of 80% would assume that 80% of the acreage is stable and 20% is disturbed. Maricopa County Air Quality Department performed rule effectiveness studies for three fugitive dust rules: Rule 310, earthmoving activities, Rule 310.01, open and vacant areas, and Rule 316, sand and gravel sites. These studies were done on an annual basis and are shown in Table V-24. The values for calendar years 2007, 2008 and 2010 were all derived per the methodology listed in the 2008 PM-10 Periodic Emissions Inventory. The increases in rule effectiveness through time is a direct result of the implementation of the control measures in this plan. The value for 2012 is the assumed value achieved as a result of the control measures in this plan projected out through 2012 (See Chapter Five of main plan for more explanation).

Table V-24
Calendar Year Rule Effectiveness Rates as Surrogates for Soil Disturbance Rates

Rule	2007	2008	2010	2012
310	76%	90%	94%	94%
310.01	85%	95%	96%	97%
316	40%	65%	73%	73%

The 11 land uses identified earlier in Figure V-16 are thus assigned disturbance rates based upon the rule effectiveness rates in Table V-24. Rule 310 serves as a surrogate value for construction land uses, Rule 316 serves as a surrogate for sand and gravel land uses, and Rule 310.01 serves as a surrogate for all remaining land uses. Rule 310.01 directly regulates all open areas and industrial/commercial areas that are permitted or un-permitted. The only land use under which Rule 310.01 does not regulate is agriculture. However, because there are no quantitative rule effectiveness or disturbance rates studies available that are applicable to agricultural land, Rule 310.01 disturbance rates are assumed to apply, as was assumed in the 2008 PM-10 Periodic Emissions Inventory. It is important to point out however, that because there are no benefits for agricultural land taken as part of the attainment demonstration or the five percent reductions, the assumed 2007 rule 310.01 effectiveness rate of 85% is held constant through 2012, meaning windblown dust emissions from agricultural lands in 2012 are the same as in 2007. All other land uses besides agriculture experience a reduction in emissions between 2007 and 2012 as a result of the benefit of increased rule effectiveness; which is pragmatically translating as an assumption of less disturbed soil in the windblown dust inventory.

Now that all of the required elements (acreage, percent disturbed, and wind speeds) have been determined, the elements are simply multiplied in order to obtain PM-10 windblown dust emissions for each land use within the high wind domain. An example equation using data from the hour 15 example high wind domain is shown below to detail how high wind emissions are calculated:

Example for calculating base year (2007) windblown dust emissions from Commercial land uses:

(1) Land use * % acreage * 15-20 mph wind * % Stable * Stable 15-20 mph = Stable Emissions
Acreage of bare soil speed periods emission factor
(250.2) * (26%) * (10) * (85%) * (2.93E-05) = 1.62E-02 Tons

+

(2) Land use * % acreage * 20-25 mph wind * % Stable * Stable 20-25 mph = Stable Emissions
Acreage of bare soil speed periods emission factor
(250.2) * (26%) * (2) * (85%) * (7.68E-05) = 8.49E-03 Tons

+

(3) Land use * % acreage * 15-20 mph wind * % Disturbed * Disturbed 15-20 mph = Disturbed Emissions
Acreage of bare soil speed periods emission factor
(250.2) * (26%) * (10) * (15%) * (1.69E-04) = 1.65E-02 Tons

+

(4) Land use * % acreage * 20-25 mph wind * % Disturbed * Disturbed 20-25 mph = Disturbed Emissions
Acreage of bare soil speed periods emission factor
(250.2) * (26%) * (2) * (15%) * (5.14E-04) = 1.00E-02 Tons

Sum of above equations (1 through 4) = 5.12E-02 Tons of PM-10 emissions from Commercial land uses.

This process is repeated for all land uses and then summed to calculate total PM-10 emissions from all land uses within the high wind domain. The only difference between 2007 and 2012 year emissions is that the disturbance rates change based upon gains in rule effectiveness, thus the reductions in emissions between 2007 and 2012 are solely attributable to increases in rule effectiveness.

The emissions that are calculated per the steps above, represent maximum potential PM-10 emissions from windblown dust. As explained in the 2008 PM-10 Periodic Emissions Inventory, a whole host of other factors including supply limitations, surface roughness, soil moisture content, vegetative cover, soil texture, etc. and would likely limit the PM-10 emissions from windblown dust to levels below what is calculated in each of the high wind domains. The 2008 PM-10 Emissions Inventory corrects for these limiters by standardizing PM-10 emissions as compared to concentrations seen at the monitor under high wind conditions. This helps to ensure the scale of the emissions estimate is not too

large. However, this step is not necessary for high wind emission inventories prepared for use in an attainment demonstration, as what is important in this rollback modeling is the difference between 2007 and 2012 emissions, not the scale of those emissions as compared to low wind emission sources. Since both 2007 and 2012 high wind emissions are calculated in the same way, the difference between the two inventories provides the reductions needed to model attainment at the monitors. The unit and scale of the inventories thus do not matter, only that the methodology is the same between the base and controlled inventories in order to claim the benefits of the measures in this plan as applied to the modeled concentrations.

Once high wind PM-10 emissions have been calculated for the land uses, one final step is required to prepare the emissions for attainment modeling. The calculated emissions for each land use parcel are divided by the distance (feet) from the modeled monitor. As discussed in an earlier section in this chapter, distance weighting is applied to this emissions in order to account for their diminishing impact on monitor concentrations with distance. The best weighting function was determined to be a simple inverse distance ratio (1/d) through analysis of dispersion behavior provided by sample AERMOD model runs (see earlier sections on source weighting and temporary monitor insights).

Tables V-25 through V-31 provide the results of the high wind emissions inventories for the high wind domains of each modeled monitor, based upon the process outlined above. They list both the calculated emissions and the inverse-distance weighted emissions for the base and controlled year inventories.

Table V-25
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for May 4, 2007 Design Day at the West 43rd Avenue Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
12	3.05	2.09	2.872E-04	1.900E-04	33.8%
13	9.49	6.36	6.529E-04	4.245E-04	35.0%
14	9.94	6.67	6.866E-04	4.454E-04	35.1%
15	13.94	9.19	8.721E-04	5.581E-04	36.0%
16	13.36	8.81	8.921E-04	5.699E-04	36.1%
17	19.01	12.39	1.190E-03	7.505E-04	36.9%
18	11.84	7.86	7.837E-04	5.033E-04	35.8%
19	6.58	4.44	5.158E-04	3.364E-04	34.8%
21	4.02	2.72	3.236E-04	2.129E-04	34.2%
22	6.63	4.48	5.104E-04	3.330E-04	34.8%
Total	97.86	65.02	6.714E-03	4.324E-03	35.6%

Table V-26
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for June 6, 2007 Design Day at the Central Phoenix Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
0	1.90	1.32	7.549E-05	5.230E-05	30.7%
1	0.99	0.74	5.184E-05	3.687E-05	28.9%
6	1.69	1.18	6.873E-05	4.797E-05	30.2%
7	0.99	0.74	5.254E-05	3.730E-05	29.0%
10	0.88	0.64	4.939E-05	3.485E-05	29.4%
11	2.01	1.41	7.319E-05	5.123E-05	30.0%
12	4.01	2.91	1.706E-04	1.166E-04	31.7%
13	7.52	5.04	2.448E-04	1.625E-04	33.6%
14	7.28	4.96	2.265E-04	1.520E-04	32.9%
15	4.33	3.04	1.657E-04	1.121E-04	32.3%
16	4.27	3.13	1.737E-04	1.192E-04	31.4%
17	2.29	1.60	8.494E-05	5.855E-05	31.1%
18	2.21	1.55	7.971E-05	5.545E-05	30.4%
Total	40.39	28.25	1.517E-03	1.037E-03	31.7%

Table V-27
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for June 6, 2007 Design Day at the Durango Complex Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
11	1.99	1.37	1.340E-04	9.011E-05	32.8%
12	3.69	2.55	2.267E-04	1.543E-04	31.9%
13	3.12	2.15	1.876E-04	1.281E-04	31.7%
14	8.02	5.49	4.672E-04	3.093E-04	33.8%
15	9.84	7.07	4.992E-04	3.379E-04	32.3%
16	5.62	3.79	3.247E-04	2.160E-04	33.5%
17	2.47	1.72	1.619E-04	1.110E-04	31.4%
Total	34.74	24.13	2.001E-03	1.347E-03	32.7%

Table V-28
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for June 6, 2007 Design Day at the Greenwood Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
12	1.05	0.77	5.872E-05	4.191E-05	28.6%
13	1.03	0.80	6.482E-05	4.701E-05	27.5%
14	3.03	2.16	1.618E-04	1.110E-04	31.4%
15	2.34	1.75	1.266E-04	8.868E-05	30.0%
Total	7.45	5.49	4.119E-04	2.886E-04	29.9%

Table V-29
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for June 6, 2007 Design Day at the Higley Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
10	0.74	0.55	6.103E-05	4.481E-05	26.6%
11	3.00	2.05	1.944E-04	1.330E-04	31.6%
12	2.15	1.54	1.805E-04	1.270E-04	29.6%
13	2.41	1.69	1.824E-04	1.268E-04	30.4%
14	5.61	3.83	2.282E-04	1.553E-04	31.9%
15	5.70	3.98	2.113E-04	1.442E-04	31.8%
16	5.65	3.90	2.065E-04	1.403E-04	32.1%
17	1.50	1.11	6.687E-05	4.791E-05	28.4%
Total	26.76	18.64	1.331E-03	9.195E-04	30.9%

Table V-30
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for June 6, 2007 Design Day at the West Phoenix Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
11	0.65	0.53	2.164E-05	1.680E-05	22.4%
12	1.78	1.33	5.329E-05	3.930E-05	26.2%
13	3.35	2.45	8.177E-05	5.933E-05	27.4%
14	4.27	3.08	1.123E-04	8.105E-05	27.8%
15	1.63	1.21	4.623E-05	3.396E-05	26.5%
Total	11.67	8.60	3.152E-04	2.304E-04	26.9%

Table V-31
Base Case 2007 and Controlled 2012 High Wind PM-10 Emissions Inventories for June 6, 2007 Design Day at the West 43rd Avenue Monitor

High Wind Hour	Un-weighted Emissions (tons)		Distance-Weighted Emissions (tons/feet from monitor)		% Reduction of Weighted Emissions
	2007	2012	2007	2012	
0	2.29	1.59	2.064E-04	1.388E-04	32.8%
5	3.31	2.29	2.894E-04	1.924E-04	33.5%
6	5.05	3.43	4.359E-04	2.860E-04	34.4%
10	3.44	2.38	2.835E-04	1.898E-04	33.1%
11	6.67	4.51	4.937E-04	3.237E-04	34.4%
12	6.02	4.06	5.697E-04	3.704E-04	35.0%
13	5.66	3.82	4.721E-04	3.088E-04	34.6%
14	9.67	6.48	6.830E-04	4.425E-04	35.2%
15	13.99	9.12	9.717E-04	6.168E-04	36.5%
16	9.67	6.48	6.630E-04	4.304E-04	35.1%
17	5.10	3.45	4.285E-04	2.812E-04	34.4%
18	4.94	3.34	3.857E-04	2.526E-04	34.5%
Total	75.81	50.97	5.883E-03	3.833E-03	34.8%

Appendix B:

Pinal County PM_{10} Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days

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Pinal County PM_{10} Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days

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Pinal County PM_{10} Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days

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1. INTRODUCTION

1.1 Background

This document contains the methodologies employed to calculate a 2008 annual, nonattainment area-wide and seven design day emission inventories for the West Pinal County PM_{10} nonattainment area (NA). This document further describes the methodology utilized to determine the seven design day emission inventory and modeling domain boundaries. Additionally, the projection methodologies for estimation of 2018 uncontrolled annual and design day emission inventories are described below. Finally, the estimated, uncontrolled 2008 and 2018 annual and design emission inventories by source categories are presented in Chapters 4 and 5.3. ADEQ includes Exhibits 1-16 as supplementary information to the descriptions below in order to provide additional explanation of the methods and assumptions presented in this document.

Source apportionment modeling impacts on individual design day monitors, attainment demonstration of the National Ambient Air Quality Standards (NAAQS), reasonable further progress (RFP), and contingency measure emission reduction analysis are presented in accompanying appendices. Please refer to Appendix C ('Pinal County PM_{10} Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days') for description of the modeling methodology used for source apportionment of PM_{10} emissions at each design day monitor. Additionally, Appendix D ('Pinal County PM_{10} Nonattainment Area 2018 Attainment Demonstration and Controlled Emission Inventories') provides descriptions of the methodologies used to calculate controlled emission inventories for the nonattainment area and the design day inventories and how these controls impacted modeled monitor impacts. Furthermore, Appendix D presents the RFP and contingency analyses.

To guide the preparation of a PM_{10} State Implementation Plan (SIP) for Pinal County, the Arizona Department of Environmental Quality (ADEQ) commissioned an analysis of the 2008 base year monitoring data, the selection of design days, the identification of emission inventory calculation procedures for key source categories, and quality assurance/quality control (QA/QC) procedures for emission inventory development. The results of this effort were documented in an Inventory Preparation Plan (IPP).[1] It showed that two separate meteorological scenarios produced concentrations in excess of the 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) of 150µg/m^3: high wind and stagnation

[1] "Pinal County PM Inventory Preparation Plan," Report No. SR2013-01-01, prepared by Sierra Research for the Arizona Department of Environmental Quality, February 2013.

conditions. The emission sources responsible for the elevated concentrations are fundamentally different under these two scenarios.

During high wind conditions, disturbed soil surfaces typically dominate PM_{10} emissions, because of the tendency of wind trajectories to remain somewhat constant during these periods, sources within a narrow band along the upwind trajectory tend to contribute significantly to recorded PM_{10} concentrations. Conversely, during stagnation periods, when wind speeds are typically below 3 mph, wind entrainment of loose soil particles is virtually nonexistent and mechanical sources that lift particles into the air through combustion, vehicle movement, and other anthropogenic activities are primarily responsible for recorded concentrations. To the extent observed emissions are dominated by the coarse fraction of PM_{10}, only those sources within a mile in any direction of a monitor significantly contribute to high hourly concentrations during stagnation conditions. Because of these differences in source mix and the need to demonstrate attainment under the range of meteorological conditions found at Pinal County monitors, the ADEQ and Pinal County Air Quality Control District advisory committee providing technical guidance for SIP development recommended that each violating nonattainment monitor selected for emission inventory and attainment demonstration development include at least one stagnation and one high wind design day. The methodology by which these design days were selected is described in Appendix A. Considerations for design day selection at each monitor included, but were not limited to: 24-hour monitored concentration, meteorology, occurrence of emitting activities, etc. For example, the selection of a stagnation design day for the Stanfield monitor first ranked the highest recorded Stanfield monitor violations and then precluded high wind days (i.e. days with at least one hour of ≥12 mph wind speed) or those days where man-made emissions would be expected to be minimal (i.e. weekend day violations). Similarly, for the Stanfield monitor high wind design day selection, violating days were ranked from high to low by 24-hour average monitored concentration and then those days which did not have multiple hours exceeding the high wind threshold of 12 mph or did not show an adequate correlation between wind speed and monitored hourly concentration were excluded[2].

The analysis of PM_{10} exceedances on <u>stagnation days</u>[3] resulted in the selection of October 29, 2008, as being representative of meteorological conditions (i.e., wind speed and mixing height) leading to elevated concentrations at the Pinal County Housing and Stanfield monitors; October 30, 2008 was found to better represent conditions at the Cowtown monitor. Each of the three monitors exceeded the 24-hour PM_{10} NAAQS on the selected design dates noted above. Because no PM_{10} exceedances occurred on stagnation days at the Maricopa, Casa Grande, or Combs School monitoring sites, they were not included in the list of low wind speed attainment demonstrations to be addressed in the SIP. To guide the preparation of the modeling inventories, rectangular low wind domains were defined based on the maximum hourly distance traversed by wind parcels from the monitor to the

[2] Please refer to "Appendix A: Pinal County PM Inventory Preparation Plan" for more information. This document was prepared by Sierra Research for ADEQ and was subsequently discussed with, reviewed by, and approved by EPA.

[3] The basis for distinguishing between low and high wind hours, and days, is the 12 mph aerodynamic entrainment threshold (i.e., five-minute average) established in MCAQD's 2008 PM_{10} Periodic Emissions Inventory.

source on the basis of wind speed and direction. Separate domains were defined for each monitor. The IPP also provided guidance on the activity data and methodology to be used in quantifying emissions for key source categories.

The analysis of PM_{10} exceedances on high wind days selected four monitors determined to be representative of conditions throughout the year, at the sites and dates listed below.

- Cowtown – April 27, 2008
- Pinal County Housing – January 1, 2008
- Stanfield – November 21, 2008
- Maricopa – October 27, 2008

The low wind domains were selected using the methodology described above; a more complex approach was used to define domains for high wind days. The domain for the high wind hours followed the methodology the Maricopa Association of Governments (MAG) used in the 2012 Five Percent Plan,[4] which plotted a back trajectory based on the average wind speed and direction recorded for each high wind hour. Each of these trajectories included land within a mile perpendicular to the trajectory on both sides; the result was therefore a 2-mile-wide parcel following the back trajectory for a distance equal to the average wind speed. To simplify the MAG methodology and limit repetitive calculations, all high wind hours were assembled into a single domain, which was easy to implement because there is little variation in wind direction during the high wind hours. The horizontal boundaries were defined by including land within a mile perpendicular to the bounding wind trajectories (i.e., all trajectories and land between them were included and the outside boundaries were extended by a mile). More discussion of the domain selection is presented in Section 2.

PM_{10} precursor analysis revealed that these emissions do not contribute significantly to elevated monitor values in Pinal County (Exhibit 16). Given the insignificance of PM_{10} precursor emissions in the degradation Pinal County air quality, the greatest impact for air quality enhancement in the region would be realized if emission controls targeted primary PM_{10}. For this reason, ADEQ focused development of the emission inventory presented in this document on the characterization of primary PM_{10} emission sources.

1.2 Approach

Since the completion of the IPP, substantial effort has been devoted to assembling the activity data and related insights needed to calculate emission inventories for each of the specified modeling domains and design days. A variety of data collection activities have been undertaken to better characterize local activity and conditions, including those listed below.

[4] "MAG 2012 Five Percent Plan for PM_{10} for Maricopa County Nonattainment Area," Maricopa Association of Governments, May 2012.

Paved & Unpaved Roads

- Traffic Research and Analysis was hired for two separate studies to collect hourly counts of vehicles operating on 20 separate unpaved road links within the selected modeling domains during the years of 2013 and 2014.

- The Maricopa Association of Governments (MAG) provided modeled estimates of VMT, speed, and vehicle mix operating on paved road.

- ADOT provided information on road shoulders (paved, graveled, etc.), which was supplemented with observations from Pinal County Air Quality Control District (PCAQCD).

- ADEQ and PCAQCD collected soil samples from a representative sample of unpaved roads (public and agricultural) and farm land. These samples were analyzed by JBR for silt and moisture levels.

Agriculture

- Cotton Research and Protection Council (CRPC) provided GIS shapefiles documenting crops under cultivation within selected modeling domains in 2008.

- The Arizona Beef Council provided information on the number of cattle located within specific stockyards on design days in 2008 and diurnal profiles of activity.

- Farmers provided information on hours of operation when harvesting and related traffic levels on agricultural roads.

Windblown Dust

- PCAQCD summarized disturbance levels observed by land use type within the nonattainment area.

- ADEQ prepared estimates of PM emission factor adjustments to account for saltation, diminished particle supply, etc., during high wind conditions.

- ADEQ, with support from PCAQCD, provided GIS shapefiles that define land use for each parcel located within the PM_{10} nonattainment area. A description of the methods used to digitize each source category is presented in Exhibit 14.

- The Pinal County Public Works Department provided digitized maps of land parcel boundaries throughout the nonattainment area.

Permitted Sources

- PCAQCD provided copies of permits for stationary sources operating within the selected modeling domains.

Construction

- PCAQCD provided information on construction permits issued in 2008.

- ADOT, MAG, and county and local municipality public works departments provided planned road improvement/construction project information.

Railroads

- Rail activity levels were obtained from reviews of local planning (e.g., National Environmental Policy Act [NEPA]) documents.

Other

- Meteorological data were obtained from the nonattainment monitors and from other stations located within the nonattainment area.

- Numerous studies and emission inventory development methods employed in related PM_{10} SIPs (e.g., MAG's Five Percent Plan) were investigated.

Collectively, this information and other sources of data were combined to prepare hourly parcel-specific estimates of PM_{10} emitted for each land use category on the selected design days within the selected modeling domains in 2008 and 2018. Stagnation and related low wind hour emissions are calculated from source-specific activity levels. High wind day and related high wind hour emissions are calculated from wind speed, surface area, and disturbance observations (and crop type for agricultural emissions).

1.3 Report Organization

Following this introduction, Section 2 discusses the need to address inconsistencies between the spatial extent of available activity data (particularly information on crops under cultivation) and modeling domains specified in the IPP. Section 3 documents the data and methods used to compute PM_{10} emissions for each of the selected source categories. Section 4 presents tabular summaries of hourly PM_{10} emissions by source category for the design days and monitors to be used in preparing attainment demonstrations. Section 5 summarizes the annual emissions inventories for 2008 and 2018. A series of appendices provides more detailed information to aspects of the analysis.

###

2. MODELING DOMAINS

As noted in the introduction, separate modeling domains were defined for both high wind and stagnant day conditions. For high wind days, separate domains were defined for high wind hours (i.e., those exceeding 12 mph) and low wind hours (i.e., those with speeds of 12 mph or less). Initially, the largest domains were defined for the high wind hours, because they extended 12+ miles upwind from the monitor. The next largest domains were defined for the low wind hours on high wind days, because the wind speeds, while less than 12 mph, were generally higher than those found under stagnation conditions (3 mph or less). Domains for stagnation conditions were the smallest because they had the lowest wind speeds. In the course of assembling the collected activity data, it was found that one of the key land use information sources—the Cotton Research and Protection Council (CRPC)—was able to provide data on crops under cultivation in 2008 only within a 6 km radius of each of the selected monitors for lands not included in Indian Reservations. Thus, while the GIS shapefiles from ADEQ/PCAQCD provide land use information for the entire nonattainment area, no information on crops under cultivation is available for agricultural lands located outside of the 6 km radius supplied by CRPC. This is a significant issue because agriculture is the dominant land use within the nonattainment area and agricultural emissions (both low and high wind) are strongly affected by the crop under cultivation. Two options are available to address this limitation: (1) assume the distribution of crops outside of the 6 km CRPC area is proportional to the crop distribution within the CRPC area or (2) restrict the size of the domain to relevant boundaries within the 6 km CRPC area. The question is really which approach limits the uncertainty in the emissions calculations. Presented below is a brief review of issues considered, the approach adopted, and figures displaying differences in the IPP and revised domains.

Each of the domains selected presents information on land use from both CRPC and from ADEQ/PCAQCD shapefiles. CRPC provided information on the crops being cultivated in 2008 and each parcel is color coded to identify the crop listed in the legend on the right of the figures. ADEQ/PCAQCD provided information on the land uses[5] listed in Table 2-1 below.

[5] A detailed description of the procedures used to identify the land uses and a description of each land use category is presented in "Twelve Pinal County Land Use Descriptions, 9/17/2013" from ADEQ.

Table 2-1 ADEQ/PCAQCD Land Use Categories
Developed Urban Lands
Developed Rural Lands (low density residential)
Paved Roads
Unpaved Roads
Cleared Areas
Residential Construction
CAFOs and Dairies
Desert Shrubland
Agricultural Croplands
Commercial Construction
Other
Site Development

2.1 High Wind Domains

High Wind Hours – The results of the source-weighting analysis[6] presented in Appendix B of the 2012 MAG Five Percent Plan were used to examine the impact of excluding sources beyond the 6 km CRPC upwind boundary. It found that "Without question, receptors close to an upwind source will be much more dramatically impacted by emissions from that source—emission rates being equal—than by similar sources at increasing distances upwind of receptors." Based on the results of AERMOD modeling for sources located at different upwind distances, a weighting factor of 1/distance was recommended to adjust windblown dust emission impacts with increasing downwind distance in any modified rollback analysis in the Salt River area. Using this relationship, it was determined that 80% of the impacts, assuming equivalent source strength, would come from sources located within 4 miles of a 12 mile upwind trajectory (i.e., 12 mph wind threshold). Based on this information, it was determined that little insight would be gained from characterizing sources beyond the 6 km (3.7 miles) boundary and that uncertainty of assuming crop distributions in upwind areas was unwarranted. A multistep process was then followed to select the appropriate domains for high wind hours on high wind days for each of the selected monitors. The process is described below, followed by a series of figures displaying (a) the original IPP domain, (b) the impact of the 6 km CRPC boundary, and (c) the boundaries of the final domain selected for modeling. They are displayed sequentially for each monitor, starting with Cowtown.

- *Figure 2-1a* displays the domain that encompasses the 7 high wind hours recorded at the Cowtown monitor on April 27, 2008. It shows each of the hourly back trajectories as well as the 1-mile area perpendicular to the bounding (outermost) trajectories.

[6] "MAG 2012 Five Percent Plan for PM_{10} for Maricopa County Nonattainment Area," Maricopa Association of Governments, May 2012.

- *Figure 2-1b* displays the effect of limiting the upwind domain to the 6 km radius of the CRPC boundary. Two legends are displayed: one shows crop type and has different colors[7] for each; the other delineates land use and crops under cultivation on non-Indian lands[8] within the 6-km CRPC boundary and land use outside of the 6-km domain. The orange area outside of the 6-km boundary predominantly to the northwest delineates Gila River Indian Community (GRIC) lands. Also displayed is a triangular domain extending along the high wind trajectory hours from the monitor. This domain is bounded by the 6-km arc and the area of dispersion impacting the monitor from each of the bounding high wind hours. AERMOD identifies sources that impact a monitor as being limited to 15° on either side of the upwind trajectory. Thus, for a one-hour period, a "V" shaped domain is defined by the area of dispersion impacting the monitor. Since multiple hours are included in the domain, the 15° area of influence is added to the outside of each bounding wind trajectory. The hypotenuse of the triangle is a straight line just inside of the 6-km CRPC boundary. To simplify calculations, emissions are computed for the domain inside of the triangle, not the slightly larger domain with the 6 km arc.

- *Figure 2-1c* provides higher resolution view of the sources located within the selected modeling domain. It shows that vacant land and alfalfa are nearest to the monitor and desert shrubland is located farthest upwind from the monitor.

Similar plots are presented in Figures 2-2 and 2-3 for Maricopa and for Pinal County Housing. Unlike Cowtown or Pinal County Housing, the Maricopa domain is shown to be predominantly composed of urban developed land, with much less land devoted to agriculture.

[7] Unfortunately, the color scheme employed by ARCGIS cannot be held constant; it changes as the number of land use categories shift. Thus, the colors in Figure 1b will not be consistent with Figure 1c or succeeding domain displays.

[8] ADEQ and PCAQCD provided land use information for Indian lands within the 6-km CRPC domain, as determined through aerial photography.

Figure 2-1a
High Wind Hours Modeling Domain Proposed in IPP for Cowtown

Figure 2-1b
Land Use for High Wind Hours Modeling Domain at Cowtown

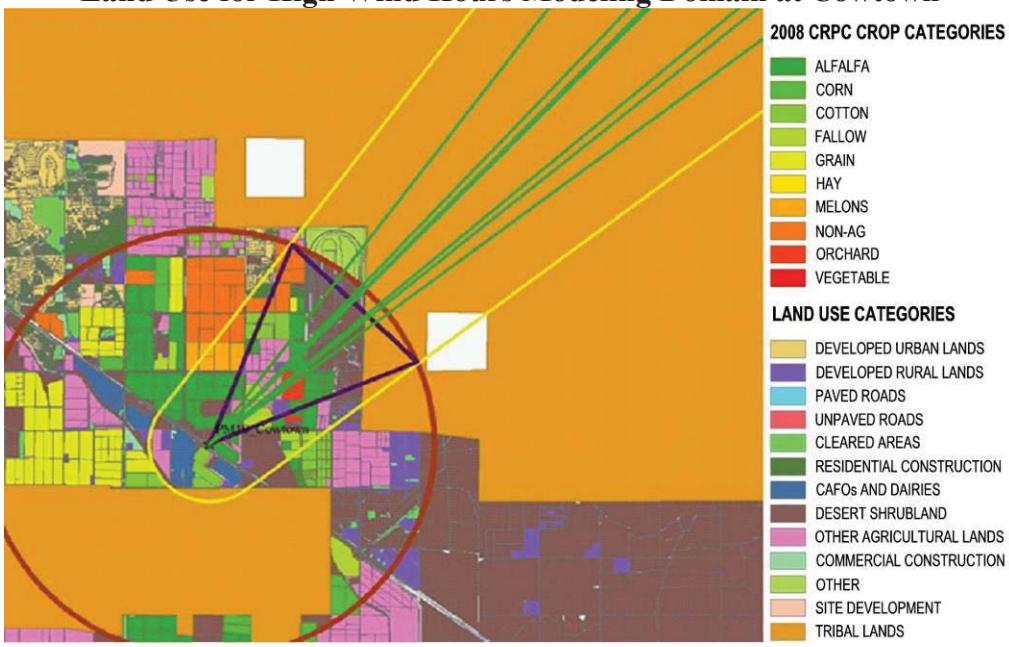


Figure 2-1c
High Wind Hours Modeling Domain Selected for Cowtown

Figure 2-2a
High Wind Hours Modeling Domain Proposed in IPP for Maricopa

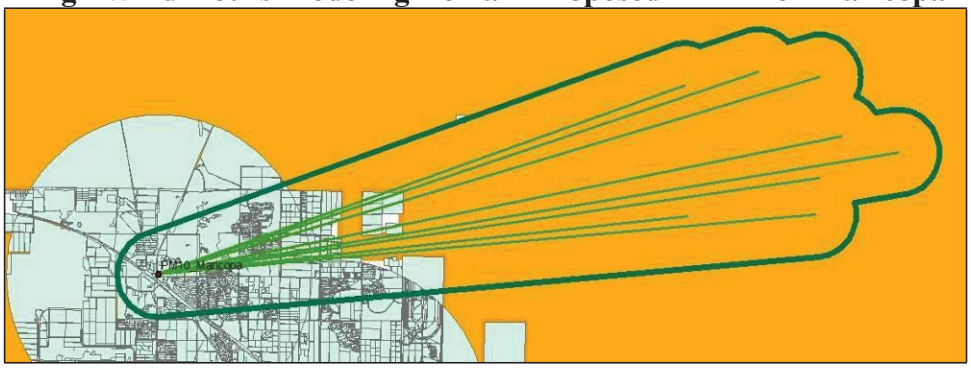


Figure 2-2b
Land Use for High Winds Hour Modeling Domain at Maricopa

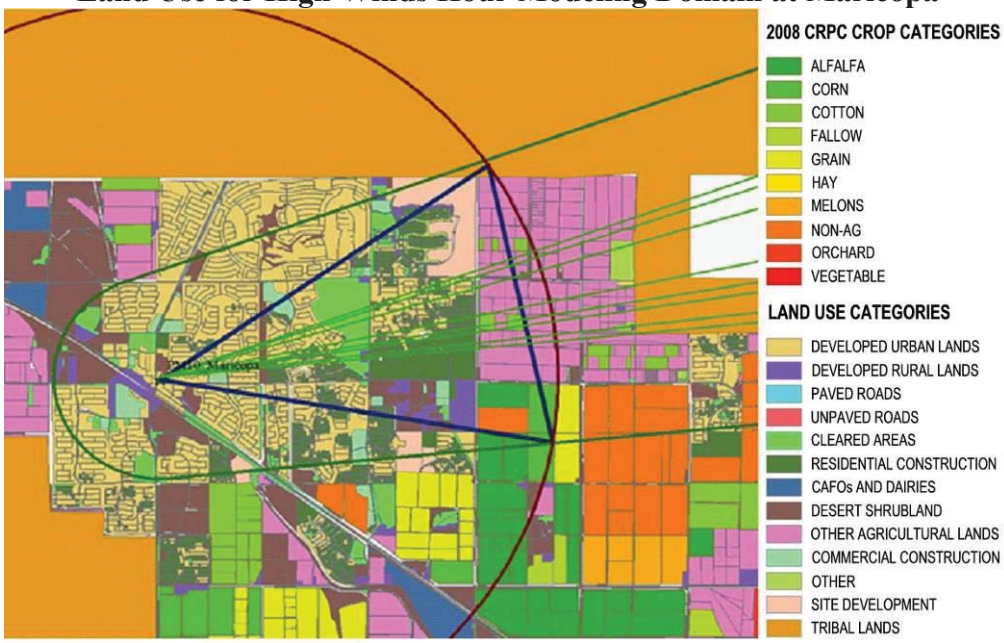


Figure 2-2c
High Wind Hours Modeling Domain Selected for Maricopa

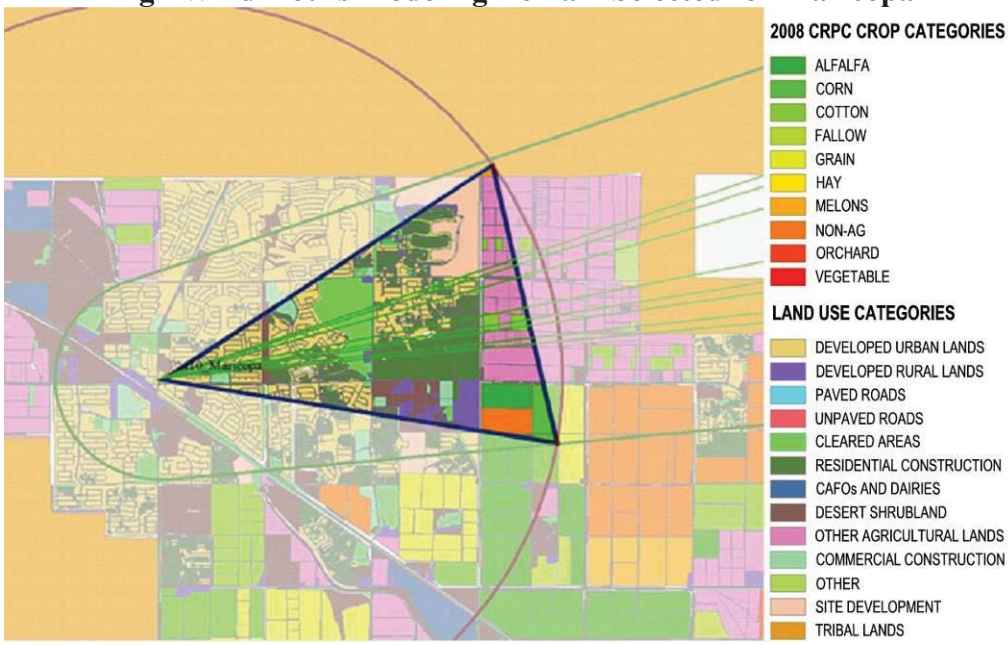


Figure 2-3a
High Wind Hours Modeling Domain Proposed in IPP for Pinal County Housing

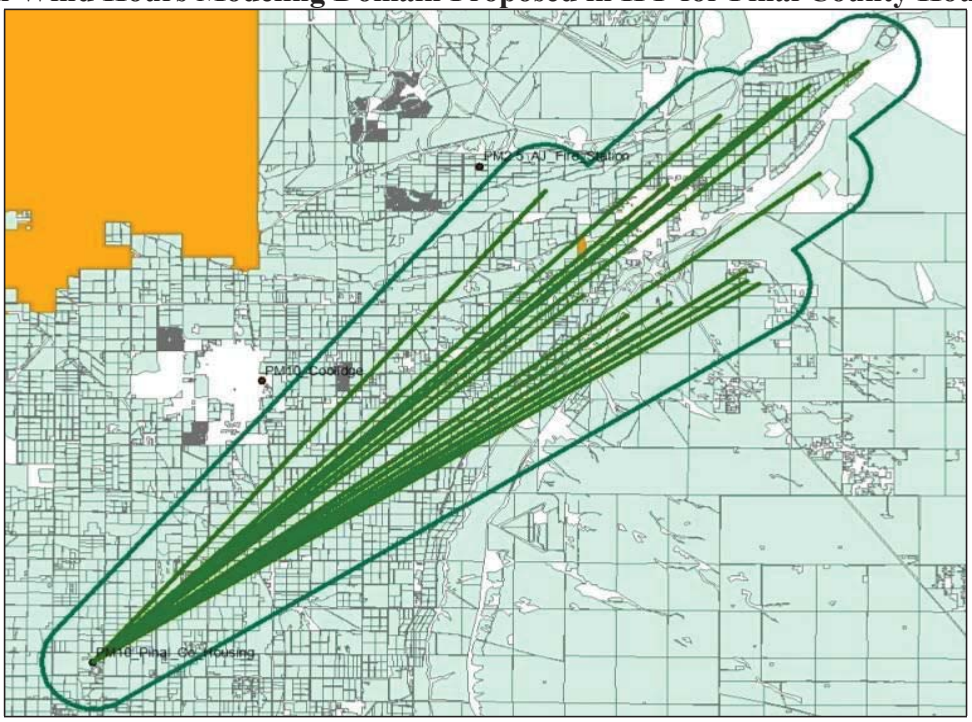


Figure 2-3b
Land Use for High Wind Hours Modeling Domain at Pinal County Housing

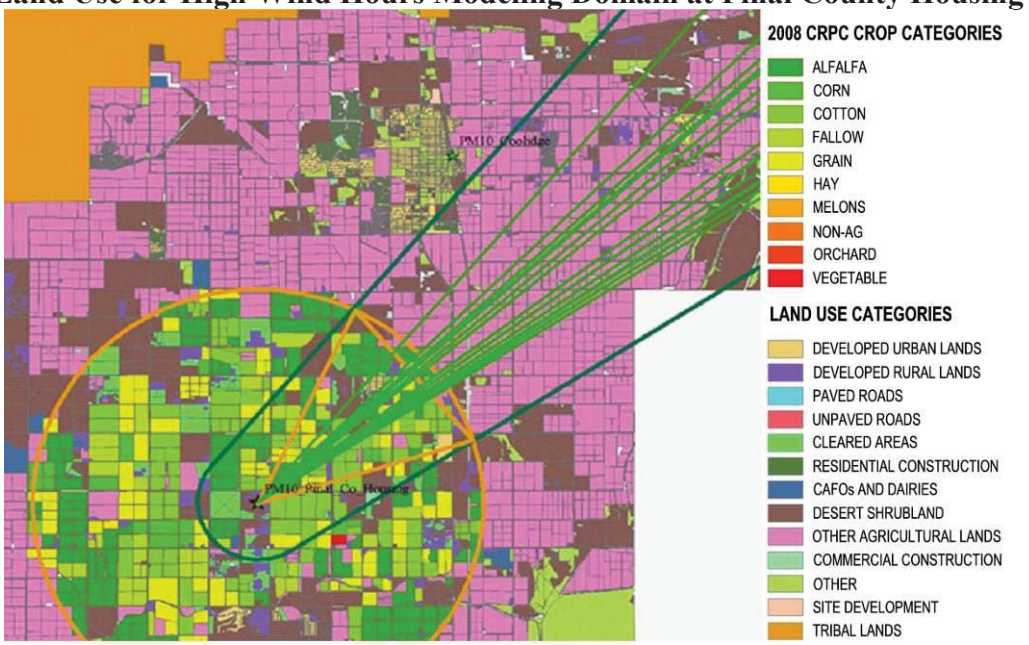
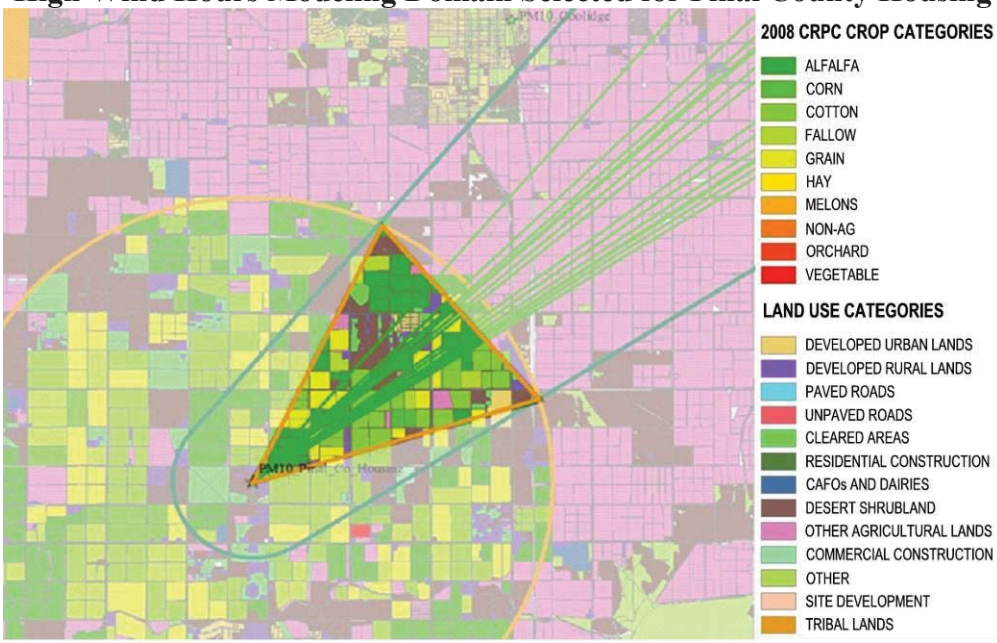


Figure 2-3c
High Wind Hours Modeling Domain Selected for Pinal County Housing



The remaining high wind domain is displayed in Figure 2-4 for Stanfield. The original IPP domain, shown in Figure 2-4a, was based on 15-minute meteorological measurements available for that site, whereas only hourly data were available for the remaining monitors. It shows that the calculated back trajectories do not follow a straight line but shift in response to the incremental values. To both standardize and simplify the inventory calculations, average hourly trajectories were computed from the 15-minute data and are plotted in Figure 2-4b. A review of the differences in land use from the two domains found that agriculture dropped from 83% in the 15-minute based domain to 73% in the average hourly domain and that desert shrubland increased from 11% to 18% with little change in the other categories. However, those values are for differences between the entire 1-hour domains—the change within the 6-km upwind domain was much less modest. Figures 2-4c and 2-4d illustrate the effect of limiting the size of the upwind domain to the 6-km CRPC data and the arcs of dispersion influence. As shown, the selected domain is largely composed of active farmland.

Figure 2-4a
High Wind Hours Modeling Domain Proposed in IPP for Stanfield (15-minute data)

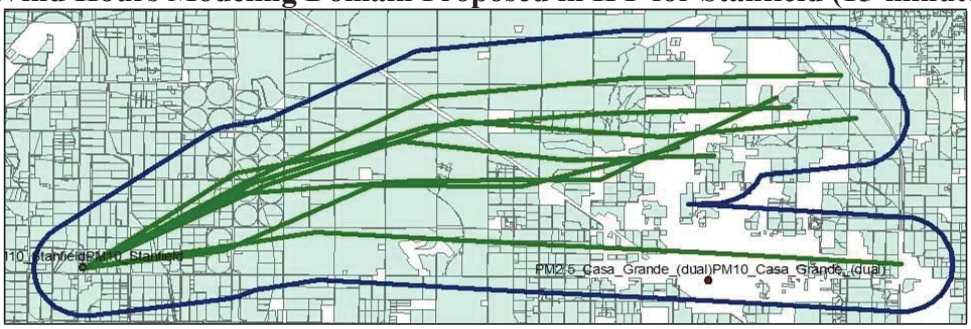


Figure 2-4b
High Wind Hours Modeling Domain for Stanfield (hourly data)

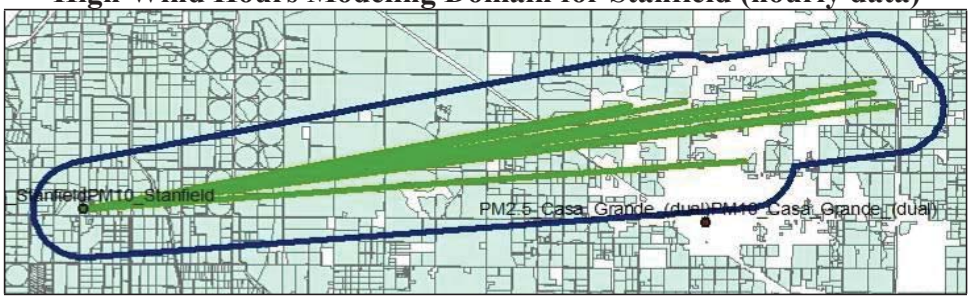


Figure 2-4c
Land Use for High Wind Hours Modeling Domain at Stanfield

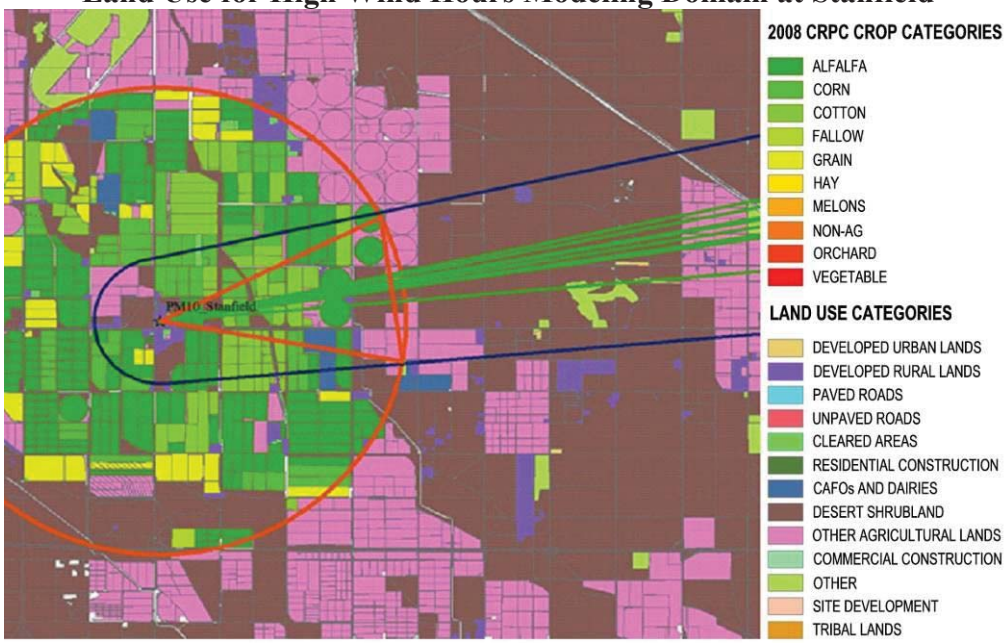
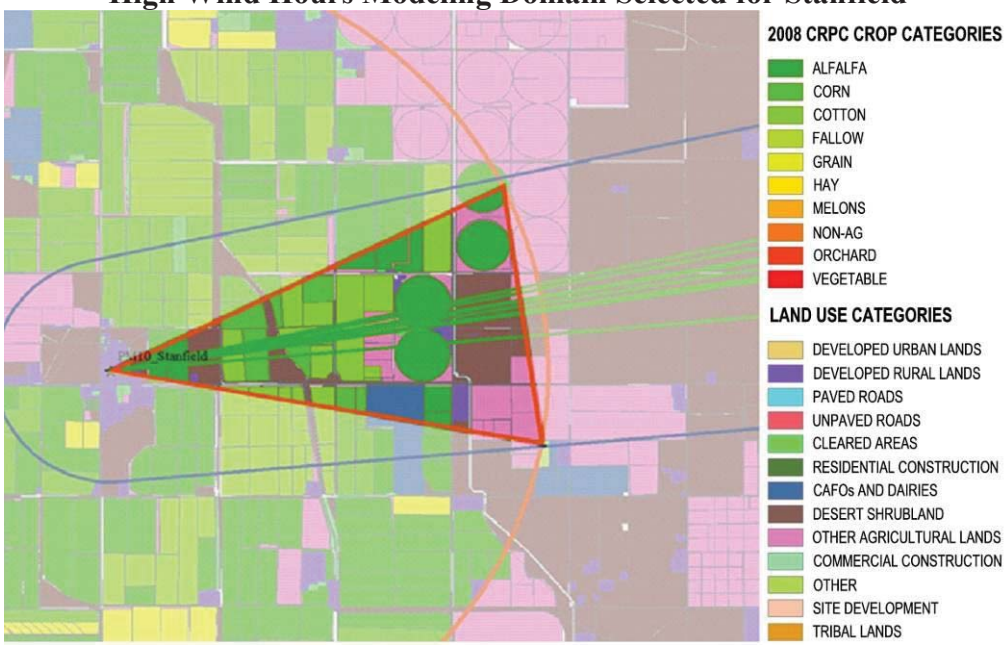


Figure 2-4d
High Wind Hours Modeling Domain Selected for Stanfield



Low Wind Hours – Following the pattern used to display the development of the high wind domains. Figures 2-5a, 2-5b, and 2-5c are displayed for the low wind hour domains (i.e. those hours when wind speed <12 mph) of the high wind design days associated with each high wind monitor: (a) the original IPP domain, (b) the impact of the 6-km CRPC boundary, and (c) the boundaries of the final domain selected for modeling. They are displayed sequentially for each monitor, starting with Cowtown.

- *Figure 2-5a* displays the domain that encompasses the 17 low wind hours recorded at the Cowtown monitor on April 27, 2008. Unlike the high wind domains where wind direction and emissions are consistently from a single quadrant, wind and emissions impacting the monitor come from all directions. The rectangle for the domain is defined by the maximum hourly wind directions and speeds. It shows the domain is considerably larger than the 6 km radius of crop data provided by CRPC. It also shows that portions of GRIC lands are encompassed both within the overall low wind domain and within the CRPC domain. While the land use of GRIC parcels within the CRPC boundary is defined, the crops under cultivation are unknown. Thus, assumptions are required for activities within the GRIC lands included within the selected modeling domain(s).

Figure 2-5a
Low Wind Hours of the High Wind Design Day Modeling Domain Proposed in IPP for Cowtown

Figure 2-5b
Land Use for Low Wind Hours of the High Wind Design Day Modeling Domain at Cowtown

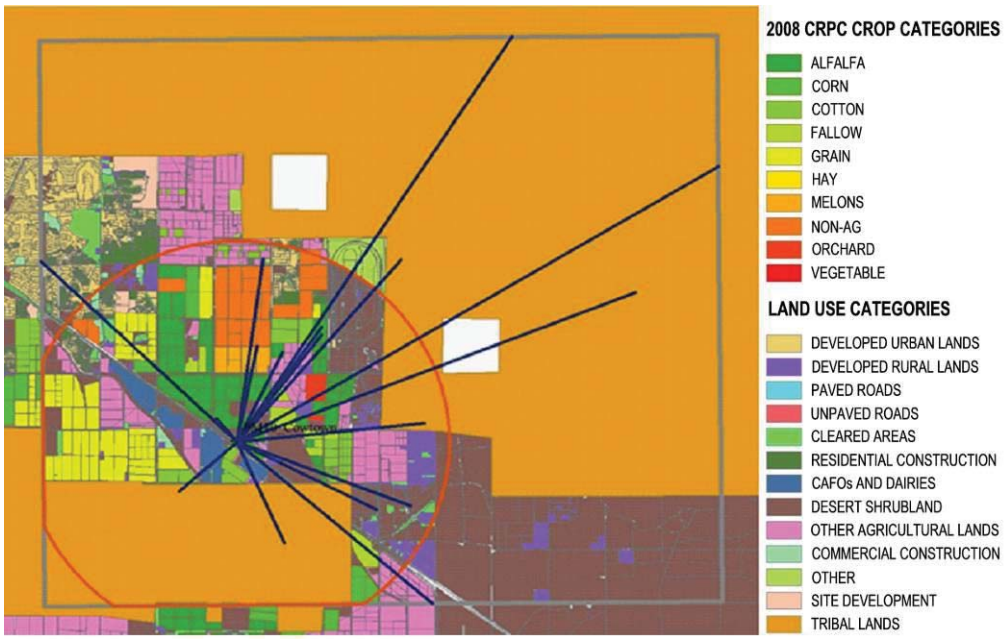


Figure 2-5c
Low Wind Hours of the High Wind Design Day Modeling Domain Selected for Cowtown

- *Figure 2-5b* has two legends: one shows crop type and has different colors for each; the other delineates land use for non-agricultural lands within the 6-km CRPC boundary and agricultural and non-agricultural land use outside of the 6-km domain. The orange area outside of the 6-km boundary predominantly to the northeast delineates GRIC lands. The Ak-Chin lands lie to the south/southwest of the monitor and are identified as having active and fallow crop land (almond and light blue colors). Similar to the GRIC, no information about crop type is available from the CRPC data for the Ak-Chin lands.

- *Figure 2-5c* shows that, given the lower wind speeds, the five hours with trajectories extending beyond the 6-km CRPC domain have little influence on the Cowtown monitor, based on the MAG weighting calculation. For this reason, a decision was made to truncate the low wind boundary to the intersection of the CRPC data and the overall domain (hence the flat boundary at the bottom of the CRPC domain).

Similar plots are presented in Figures 2-6, 2-7, and 2-8 for Maricopa, Pinal County Housing, and Stanfield.

Figure 2-6a
Low Wind Hours of the High Wind Design Day Modeling Domain Proposed in IPP for Maricopa

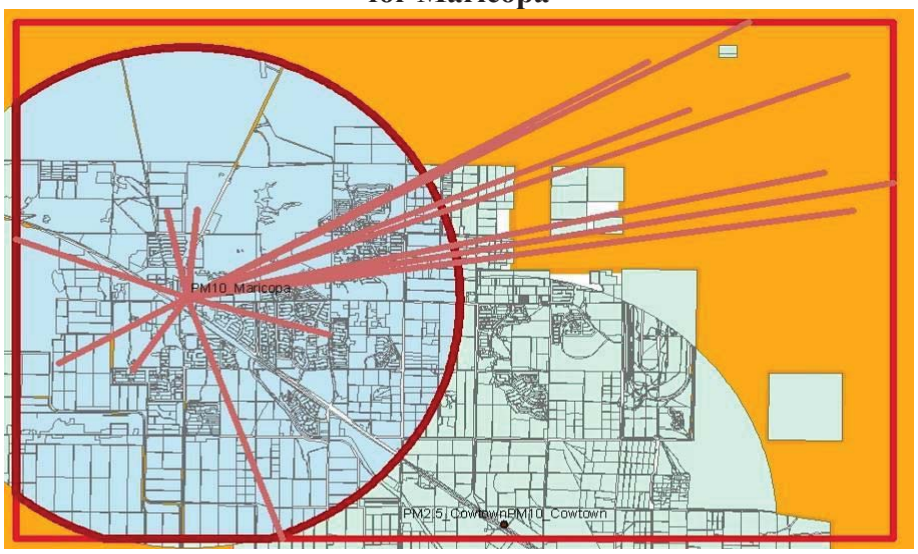


Figure 2-6b
Land Use for Low Wind Hours of the High Wind Design Day Modeling Domain at Maricopa

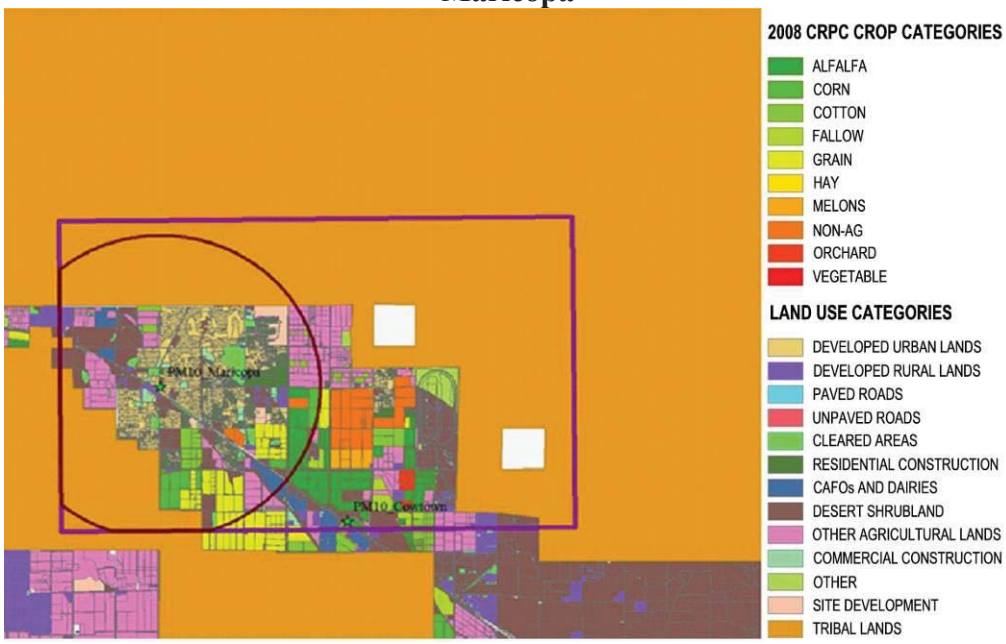


Figure 2-6c
Low Wind Hours of the High Wind Design Day Modeling Domain Selected for Maricopa

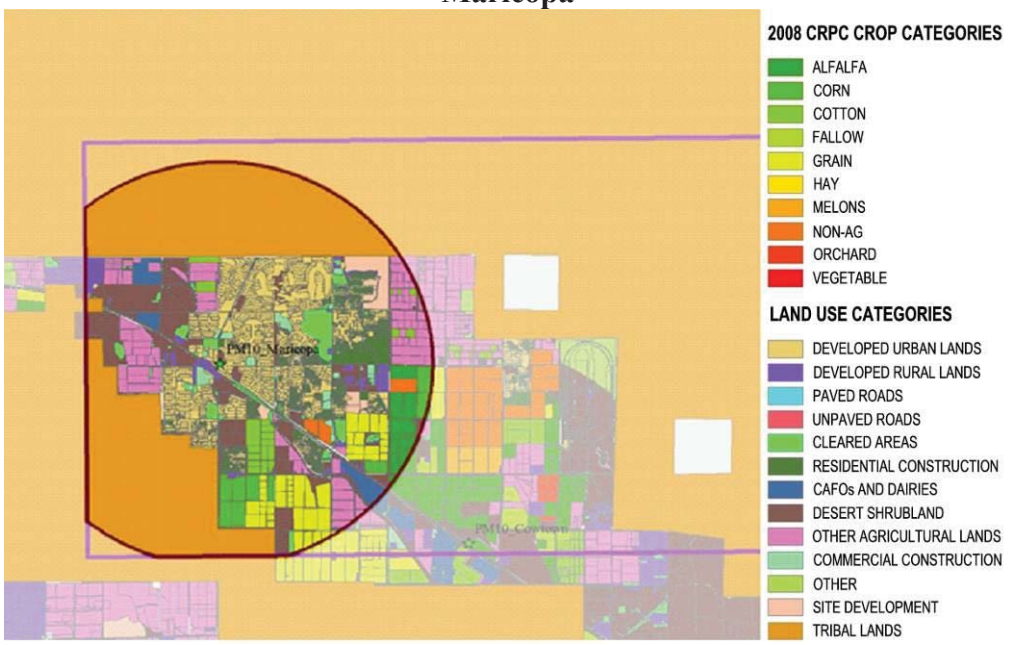


Figure 2-7a
Low Wind Hours of the High Wind Design Day Modeling Domain Proposed in IPP for Pinal County Housing

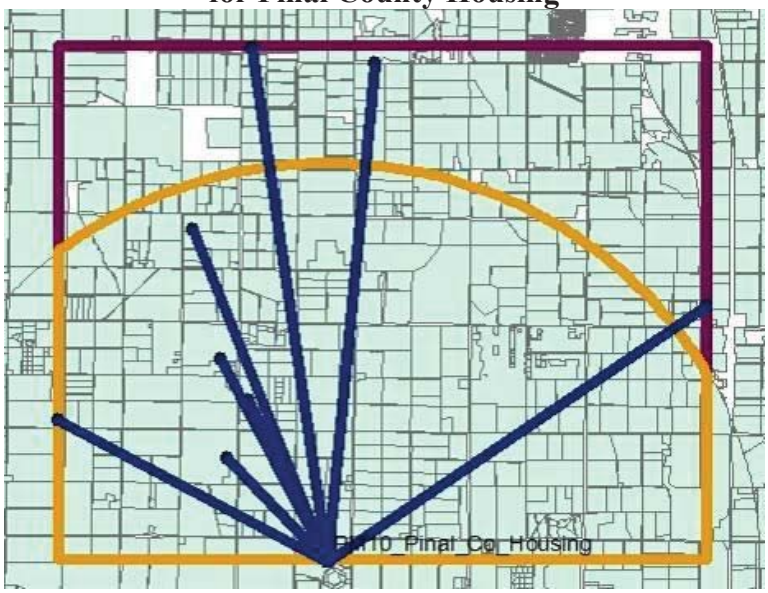


Figure 2-7b
Land Use for Low Wind Hours of the High Wind Design Day Modeling Domain at Pinal County Housing

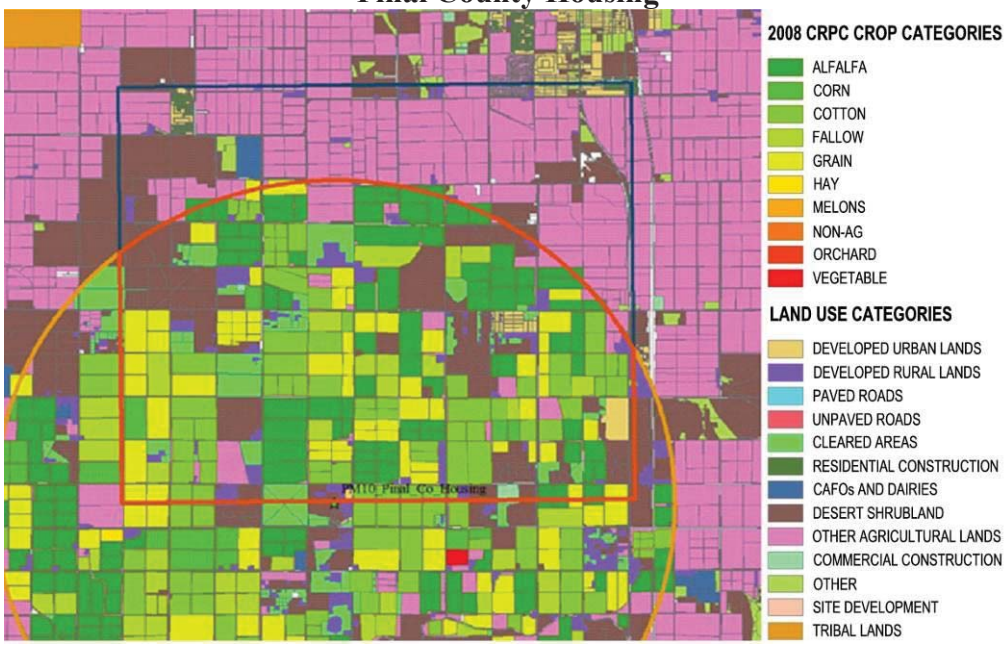


Figure 2-7c
Low Wind Hours of the High Wind Design Day Modeling Domain Selected for Pinal County Housing

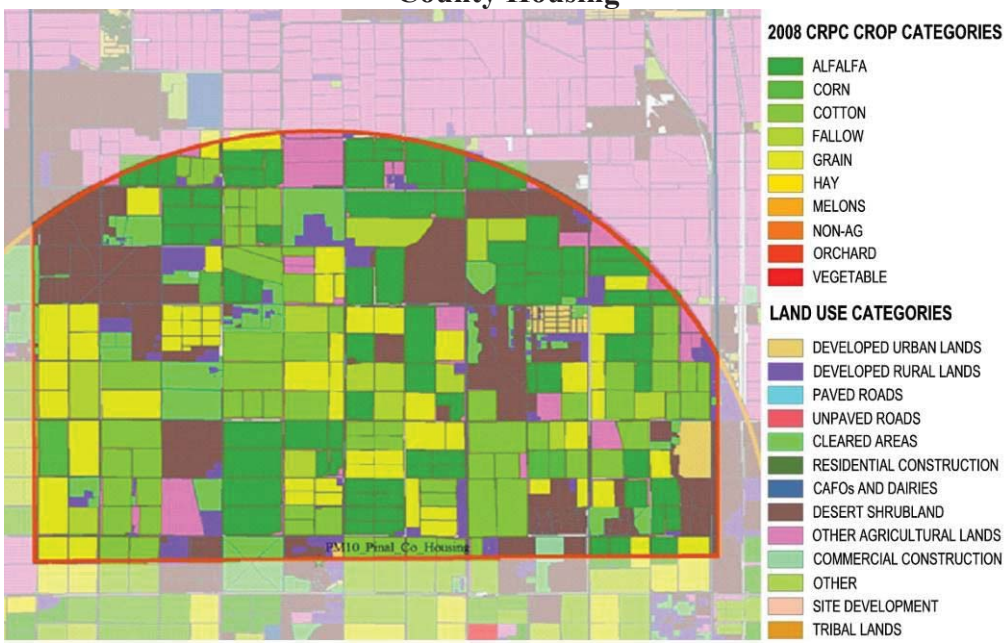


Figure 2-8a
Low Wind Hours of the High Wind Design Day Modeling Domain Proposed in IPP for Stanfield

Figure 2-8b
Land Use for Low Wind Hours of the High Wind Design Day Modeling Domain at Stanfield

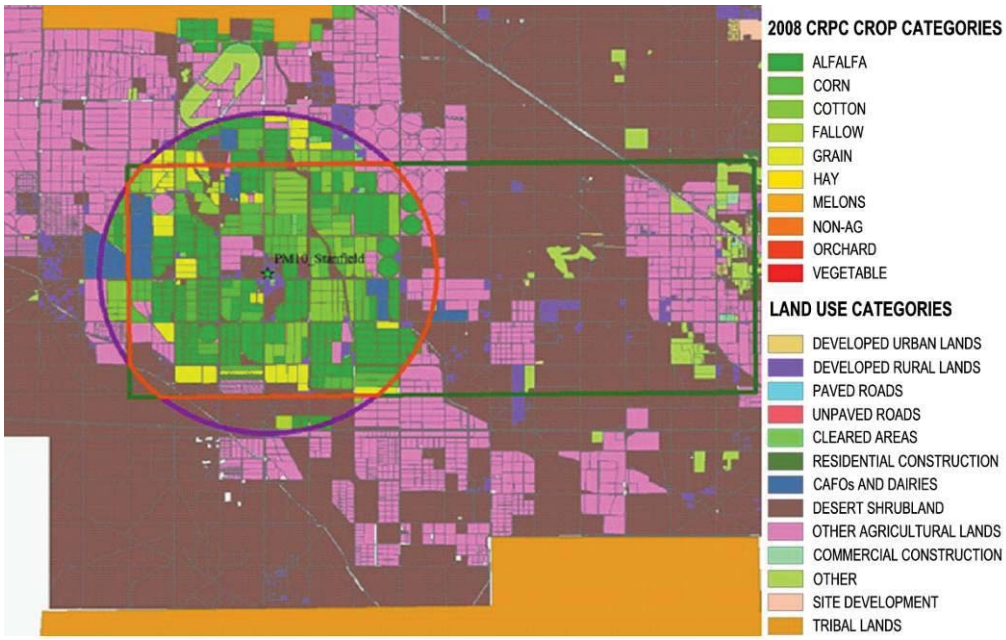
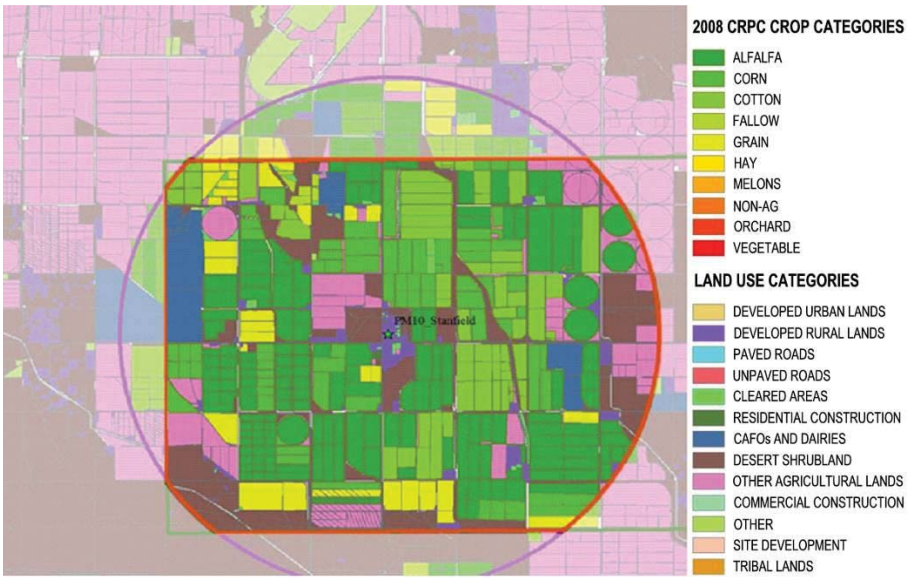


Figure 2-8c
Low Wind Hours of the High Wind Design Day Modeling Domain Selected for Stanfield



2.2 Low Wind Domains

As noted earlier, three monitors exceeded the 150 $\mu g/m^3$ standard under stagnation conditions: Cowtown, Pinal County Housing, and Stanfield. Since the wind speeds on the October 29 and October 30, 2008 design days were extremely low (some fell below the measurement threshold of the monitor), the domains generally fell within the 6 km boundary of the data provided by the CRPC. Figures 2-9, 2-10, and 2-11 display the relationship between the IPP boundaries and the CRPC boundaries. Figure 2-9 shows that the Cowtown domain is slightly larger than the CRPC domain and that assumptions were needed for addressing crops under cultivation on both GRIC and Ak-Chin lands. Figure 2-10 shows that the low wind domain for Pinal County Housing falls entirely within the CRPC domain, so no additional assumptions about crop activity were required. Figure 2-11 shows that small portions of the Stanfield modeling domain fall outside of the CRPC boundary so assumptions about crop activity on agricultural lands outside the boundary were needed (no Indian lands fall within this domain). These assumptions, which are described in Section 3.1.1.1, parallel the approach adopted to characterize crops cultivated on Indian lands.

The closure of several significant emission sources near the Cowtown monitor between 2008 and 2011 and the continued recording of 24-hour PM_{10} exceedances at the monitor caused a reassessment of the 10/29/08 design day for that monitor. The resulting analysis, presented in Exhibit 12, led to the selection of 10/30/08 to represent low wind conditions at the Cowtown monitor. An analysis of the modeling domains for 10/29/08 and 10/30/08, presented in Exhibit 13, concluded that the mixture of emission sources located within the October 29th domain was sufficient to represent sources impacting the Cowtown monitor on October 30. This led to a decision to retain the 10/29/08 modeling domain to represent the 10/30/08 design date.

Figure 2-9
Stagnation Modeling Domain Selected for Cowtown

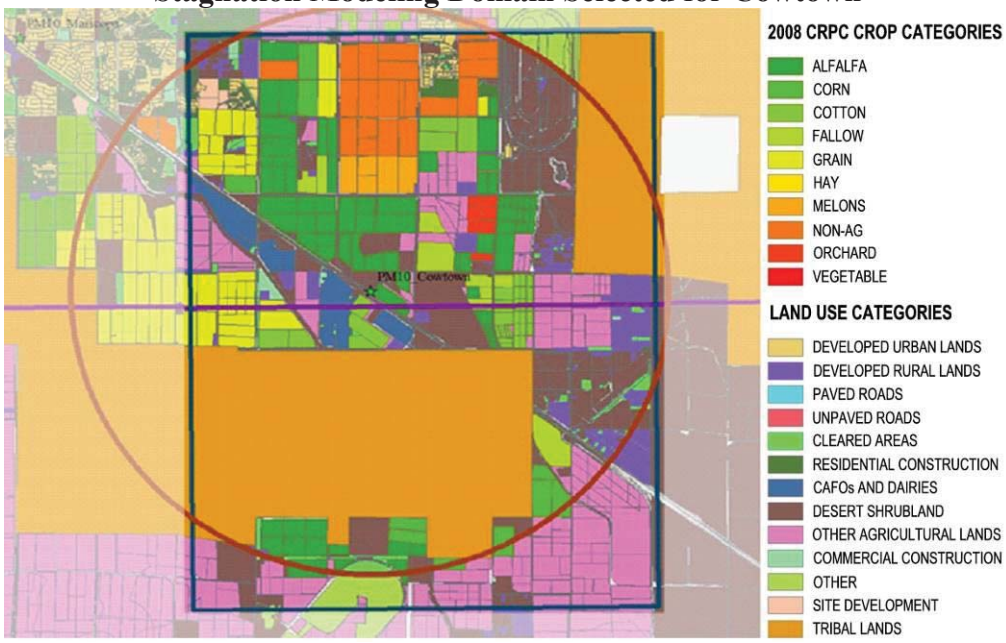


Figure 2-10
Stagnation Modeling Domain Selected for Pinal County Housing

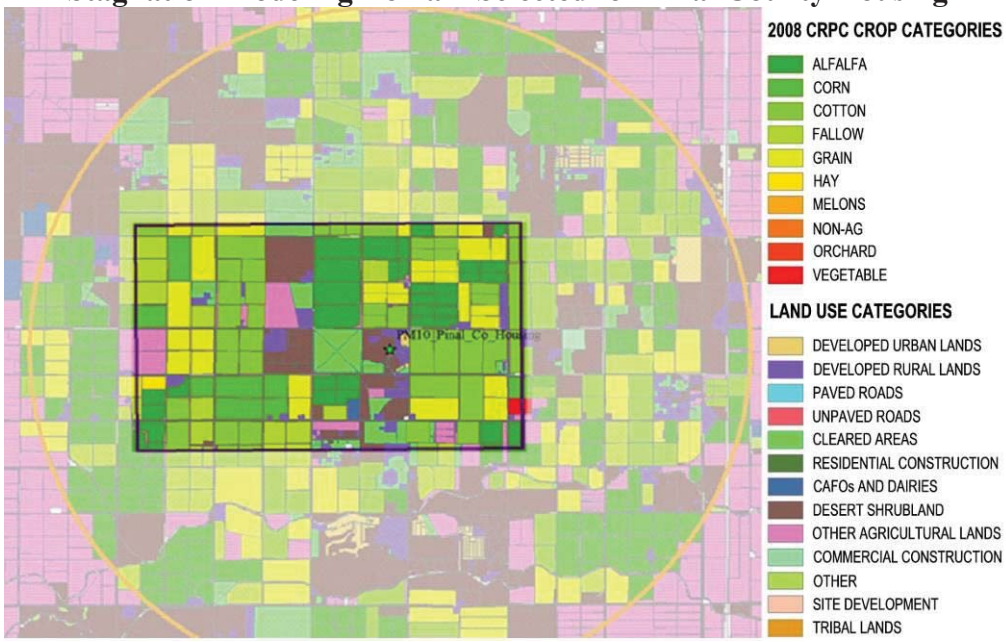
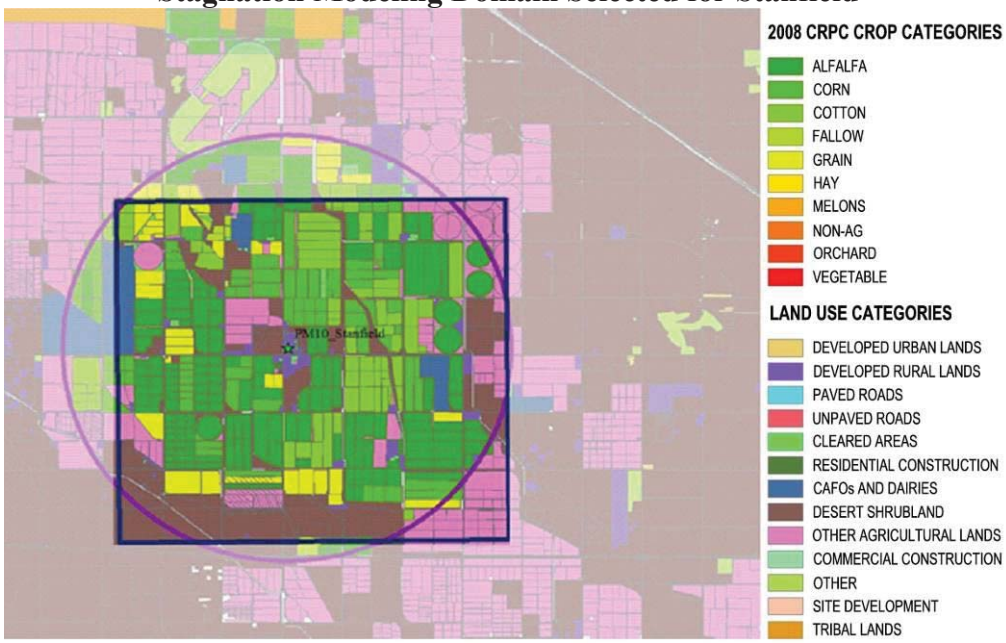


Figure 2-11
Stagnation Modeling Domain Selected for Stanfield



###

3. EMISSION METHODS

As noted in the Introduction, considerable effort has been devoted to collecting, assembling, and assessing the activity data and related insights needed to calculate emission inventories. Presented are separate discussions of methods for calculating low wind emissions and high wind emissions in both 2008 and 2018.

3.1 Emission Methods – 2008

3.1.1 Low Wind Methodologies

A review of the data and methods employed to quantify emissions for each of the key low wind source categories is provided below. The emissions calculated in these methodologies include all non-windblown related emission activities and occur on stagnation and high wind design days.

3.1.1.1 Agriculture Methodology

Several methods are available to estimate fugitive dust emissions from agricultural operations; these include the Technical Support Document (TSD)[9] developed for Agricultural Best Management Practices (BMP) in Arizona, the Western Regional Air Partnership (WRAP) Fugitive Dust Handbook,[10] and the California Air Resources Board (CARB) paper titled "Computing Agricultural PM_{10} Fugitive Dust Emissions Using Process Specific Emission Rates and GIS."[11] Maricopa County in both the 2008 Periodic Emissions Inventory[12] and the MAG 2007 Five Percent Plan modeling[13] used the tillage methodology from the TSD, and estimated harvest emissions using crop-specific emission factors from CARB. Since these methods are designed to produce annual emission estimates associated with these activities, the challenges when modeling a specific design day include not only how to allocate the annual estimates to a daily value, but also how to spatially apportion the emissions to specific parcels. Several methods have been developed to address the allocation challenge, because without information on how operations

[9] Eastern Research Group, 2001. Technical Support Document for Quantification of Agricultural Best Management Practices.
[10] Countess Environmental, 2006. WRAP Fugitive Dust Handbook. Ch. 2 & 10.
[11] Gaffney, P., Yu, H., 2003. Computing Agricultural PM_{10} Fugitive Dust Emissions Using Process Specific Emission Rates and GIS. U.S. EPA Annual Emission Inventory Conference.
[12] Maricopa County Air Quality Department, 2011. 2008 PM_{10} Periodic Emission Inventory.
[13] "Air Quality Modeling for the Salt River Area in Support of the Five Percent Plan for PM-10," Sierra Research, November 2007

occurring in the fields are impacting violating monitors on the design day, it is not possible to have certainty about the fugitive dust produced by agricultural operations on a day-to-day basis.

Presented below is a summary of the methods used to quantify annual emissions and to assess their potential impacts on selected design days. It is important to note that the number of operations required to cultivate and harvest a crop varies and therefore emissions vary considerably by crop type. Given the predominance of agricultural land use within the nonattainment area and most of the selected modeling domains, considerable effort was devoted to researching information about the crops being cultivated on individual land parcels. More information about the approaches adopted to research and apply information provided by the CRPC on crops under cultivation in 2008 is presented in Section 2. For those crop fields within modeling domains for which CRPC did not specify crops, the weighted average crop distribution of known crops within the modeling domain of interest was assigned to the unspecified field and tilling and or harvesting emissions were calculated using the methodologies listed below for known crops.

Tilling – Tillage emissions were estimated using the emission factor equation employed in the TSD, combined with tillage activity estimates. The tillage emission factor equation is shown below.

$$EF_{tillage} = k\,(4.8)\,s^{0.6}$$

where:

$EF_{tillage}$ = Agricultural emission tillage factor (lbs PM_{10}/acre-pass)
k = Particle size multiplier (this value is 0.15 for PM_{10})
s = Percent silt content of soil (12.1% for Pinal County)[14]

Given that the silt content of the soil in Pinal County is 12.1%, the tillage emission factor for Pinal County is calculated as follows:

$$EF_{tillage} = 0.15 \times 4.8 \times (12.1)^{0.6} = 3.21 \text{ lbs } PM_{10}\text{/acre-pass}$$

This emission factor is used to calculate the annual crop-specific PM_{10} emissions associated with agricultural tillage using the following equation:[9]

$$\text{Tillage}_{crop} = EF_{tillage} \times AP_{crop} \times A_{crop}$$

where:

$Tillage_{crop}$ = Annual PM_{10} emissions from tilling each crop type (lbs)
$EF_{tillage}$ = Tillage emission factor (lbs PM_{10}/acre-pass)
AP_{crop} = Number of tillage passes per crop (passes)

[14] Calculated from "Summary of Silt and Moisture Analyses of Soil Samples from Pinal County, Arizona, Collected on May 8th, 2013," JBR Environmental Consultants, June 26, 2013

A_{crop}= Number of tilled acres for each crop type parcel (acres)

One option to estimate daily crop-specific tilling emissions is to divide the annual emissions by the estimated days per year of tillage operation for each crop (shown below in Table 3-1), which are based on the assumption that tillage activities occur seven days per week during the months of tillage operations. This approach spreads the annual emissions uniformly over the period of time when they can occur. The reality, however, is much different—tillage occurs during a limited number of days and the number of acres impacted is a function of the equipment available to individual farms (either directly owned or leased or through contracted operations) and the power requirements of the operation. The TSD addressed this issue by dividing the year into tilling periods (e.g., March-May) and assuming that tilling was normally distributed throughout the period. This resulted in an estimate of a 1% chance of activity on a particular day, roughly paralleling the approach of distributing annual emissions over the period in which they can occur.

Since tillage operations are unlikely to occur more than once per day on the same acre of land, an alternate approach would be to estimate the number of acres that could be actively tilled in a day on an average farm. Assuming an average tilling rate of 36 acres/day (3 acres per hour over a 12-hour day) and 2 tractors/farm,[15] roughly 72 acres can be actively tilled in a day. According to the 2007 Census of Agriculture,[16] the average farm size in Pinal County is 1,334 acres; thus, it would take 19 days to complete one operation over the entire farm. Since multiple operations are required, roughly 100 days per year would be required to complete the tillage operations specified in Table 3-1 for most crops. A review of the time allotted to tilling operations in the Pinal County

Table 3-1
Tillage Operation Assumptions

Crop	Number of Tillage Passes Per Year	Tillage Operations (days/yr)
Alfalfa	5.1	91
Corn	7.3	152
Cotton	8.8	364
Grain	3.1	243
Vegetable	14	182
Hay	5.1	91
Melon	14	182
Orchard	5	91

[15] These assumptions, which are recognized as rough, given variations in farm size, tillage practices, soil organic content, etc., were confirmed in a discussion with the Pinal County Extension Agent Rick Gibson, 7/16/13.

[16] *http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Arizona/cp04021.pdf*

Crop Calendar[17] indicates that the time allotted to tillage operations is considerably smaller than the values cited in Table 3-1, and discussions with Pinal County farmers has indicated that values in Table 3-1 are overstated. Presented below is a comparison of alfalfa emission estimates associated with distributing emissions over the available tillage days (Method 1) and a bottom-up estimate of the number of acres per farm that can be tilled on a typical day (Method 2) for an average farm in Pinal County.

Method 1: (3.21 lbs/acre pass x 5.1 acre passes x 1,334 acres)/91 days = 240 lbs/day

Method 2: 3.21 lbs/acre pass x 72 acres/day = 224 lbs/day

Given the uncertainty in the assumptions, the difference in the emission estimates is minimal for alfalfa; the more significant difference is that the Method 1 value would be spread out over 1,334 acres and the Method 2 value would be spread out over 72 acres or 5.4% of an average farm (72/1,334) per day. The differences between the methods will vary among crops, depending on the number of operations and number of days available for tillage. The most extreme example is cotton, where Method 1 would produce an emission estimate that is less than half the Method 2 value (104 lbs/day versus 224 lbs/day). Given the potential difference in emissions between the methods and the dominance of cotton cultivation, Method 2 estimates have been chosen for use in estimating design day emissions.

Several alternatives were considered in determining where field activities occur within the modeling domain.

Since field operations do not occur on all fields within the modeling domain at the same time, a decision was required regarding where to allocate the activity. After considering alternatives (e.g., allocating activity to parcels closest to the monitor, allocating activity farthest from the monitor, etc.), a decision was made to spread activity across each parcel in the domain. Thus, emissions were calculated for 5.4% of each crop parcel with tilling activity.

Initial discussions with farmers indicated that tilling and harvesting activity was limited to daylight hours. More recent discussions with farmers, however, found that 50% of cotton farmers were performing tilling at night in 2008 and this practice continues to today. This information was used to prepare crop-specific diurnal activity profiles. Two values are presented for cotton—the first is for tilling and second is for harvesting. These values, presented in Table 3-2, can be used to distribute daily emission estimates by crop to hourly values. As can be seen, with the exception of cotton, all crop-specific activity is evenly distributed over the 12 daytime hours (i.e., 6:00 am to 6:00 pm) on the design days.

[17] Email from Kate Edwards, Pinal County Air Quality Control District, 2008 Crop Calendar Corrected, 4/04/13. The Crop Calendar was derived from information presented in the Arizona Agricultural Statistics Bulletin.

Table 3-2 Percent of Daily Activity Conducted During Each Clock Hour								
Hour	Alfalfa	Corn	Cotton	Grain	Vegetable	Hay	Melon	Orchard
1	0	0	2.8/0	0	0	0	0	0
2	0	0	2.8/0	0	0	0	0	0
3	0	0	2.8/0	0	0	0	0	0
4	0	0	2.8/0	0	0	0	0	0
5	0	0	2.8/0	0	0	0	0	0
6	0	0	2.8/0	0	0	0	0	0
7	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
8	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
9	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
10	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
11	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
12	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
13	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
14	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
15	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
16	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
17	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
18	8.3	8.3	5.6/8.3	8.3	8.3	8.3	8.3	8.3
19	0	0	2.8/0	0	0	0	0	0
20	0	0	2.8/0	0	0	0	0	0
21	0	0	2.8/0	0	0	0	0	0
22	0	0	2.8/0	0	0	0	0	0
23	0	0	2.8/0	0	0	0	0	0
24	0	0	2.8/0	0	0	0	0	0

Harvesting – Annual PM_{10} emissions associated with harvesting activities are estimated using the following equation, which utilizes crop-specific emission factors:[18]

$$Harvest_{crop} = EF_{crop} \times A_{crop} \times (1 \text{ ton}/2{,}000 \text{ lbs})$$

where:

$Harvest_{crop}$ = harvest emissions for each crop type (tons PM_{10}/yr)
EF_{crop} = harvest emission factor (lbs PM_{10}/acre)
A_{crop} = number of harvested acres for each crop specific parcel per year

[18] Area-wide Source Methodologies, Section 7.5 Agricultural Harvest Operations, revised January 2003. California Air Resources Board, 2003. *http://www.arb.ca.gov/ei/areasrc/index7.htm*

The issue of how to allocate annual harvest emissions to a specific day parallels the tilling allocation challenge. In the case of harvest emissions, however, fewer assumptions are needed because meetings with Pinal County farmers indicated that they could only harvest 80–100 acres of cotton/day. Choosing the upper limit of 100 acres/day, it was determined that only 100 acres/1,334-acre farm—or 7.5% of an average farm—could be harvested per day. Stated another way, it could be assumed that on any given day, at most 7.5% of the cotton parcels identified in the selected modeling domains could be actively harvested (because farms typically cultivate more than one crop).

Thus, for an average farm, harvest emissions for cotton would be calculated as follows:

$$\text{Harvest emissions}_{\text{cotton}} = 3.4 \text{ lbs/acre} \times 100 \text{ acres/day} = 340 \text{ lbs/day}$$

Distributing these emissions must still be addressed—either they can be spread across all the 1,334 acres of an average farm (which is not identified in any of the available parcel data), they can be distributed proportionately to each parcel by crop, or they can be allocated closer and farther from the monitor through bounding scenarios. The approach adopted to address this issue for tilling will be used for addressing the allocation of harvest activity.

Hourly crop-specific harvesting emissions can be calculated using the assumptions discussed above under the tillage discussion; activity is evenly distributed over the 12 daytime hours (i.e., 6:00 am to 6:00 pm) on the design days. Therefore, the diurnal variation for harvesting operations during the design days is identical to that shown in Table 3-2.

Table 3-3
Harvest Operation Assumptions

Crop	Emission Factor (lbs/acre-yr)[a]	Harvesting Operations (days/yr)[b]
Alfalfa	0	294
Corn	1.68	91
Cotton	3.4	143
Grain	5.8	60
Vegetable	0.08	116
Hay	1.68	294
Melon	0.08	116
Orchard	0.08	188

a. The EF (lbs/acre-yr) is extracted from the CARB, 2003 study.
b. Crop operation schedule is extracted from the MAG 2012 5% Plan.

Design Day Calculations – As noted earlier, October 29, 2008, was selected to represent stagnation conditions at Pinal County Housing and Stanfield, and October 30, 2008 was selected for Cowtown. A review of the Crop Calendar found that no planting activity occurs at this time of year. Instead, most crops are either being harvested or have already been harvested. This was confirmed by discussions and correspondence with Pinal County farmers. Utilizing the crop calendar and the information received from Pinal County farmers, harvest activity is limited to the following crops on the designated stagnation design days: alfalfa, cotton, vegetables, melons, and hay. Using this information, crop distributions were quantified for each of the modeling domains. The distributions for the stagnation design days, presented in Table 3-4, show land use shares for each of the harvested crops, the remaining CRPC crops not being harvested, fallow land, and Other Agricultural Land.[19]

Separate emission estimates were calculated for each agricultural land parcel in each modeling domain for the actively harvested crops shown in Table 3-4. No activity or emissions were assumed to occur for the remaining crops or fallow land. Other Agricultural Lands harvest emissions were calculated as the average emissions rate weighted by relative acreage of known cropland within the individual modeling domains.

Table 3-4
Crop Distribution for Stagnation Design Day Modeling Domains
(%)

Crop Category	Cowtown	Pinal County Housing	Stanfield
Alfalfa	17.9	22.1	40.2
Cotton	4.1	30.1	17.0
Hay	0.0	0.5	0.0
Vegetables	0.0	0.3	0.0
Melons	1.5	0.0	0.0
Remaining Crops	18.2	31.3	25.7
Fallow	2.1	9.8	0.1
Other Ag Lands	56.3	6.0	17.0
Ag Land Share (%) of the Domain	57.7	77.5	73.0

[19] A review of the information presented in the shapefiles provided by ADEQ/PCAQCD and CRPC found CRPC did not identify crops for all agricultural parcels within its 6 km domain (i.e., within the overlap of the two shapefiles for each modeling domain). In addition, there are agricultural parcels located within the stagnant modeling domains that are outside of the CRPC 6 km domain or on Indian lands that have no crop information. The overall portion of these "Other Agricultural Lands" varies by monitor.

3.1.1.2 Concentrated Animal Feeding Operations (CAFO)

Literature Search – The identification of an appropriate PM_{10} emission factor for use in assessing design day and future emission levels from feedlot operations near the Cowtown monitor began with a limited literature search of feedlot emission monitoring studies. The search identified seven peer-reviewed studies of feedlot PM_{10} emissions published between 1994 and 2012. Emission factors reported in these studies ranged from 0.0092[20] to 0.063 lb[21] PM_{10}/head-day. Most of the studies reported emission factors on an annual-average-day basis only, intended for use in compilation of annual emission inventories. Understanding that feedlot emissions vary significantly from hour to hour based on specific activities such as animal feeding schedules, the use of an annual-average-day value was deemed to be too limiting in attempting to characterize the contributions of feedlots to hourly air quality impacts for a 24-hour attainment demonstration at the Cowtown site.

The most robust study gleaned from the literature search, one that included seasonal and diurnal profiles of emissions from two feedlots over a two-year period, was a study conducted in Kansas by Bonifacio et al.[22] Because feedlot pen emissions were demonstrated in the study to be proportional to ambient temperatures and resulting evapotranspiration (ET) rates, and because temperatures and ET rates are higher in Pinal County than in Kansas, the representativeness of these factors to Cowtown feedlots was questionable. Because the Cowtown feedlots were located 0.17 to 2.44 miles from the Cowtown monitoring station, and because the monitoring station has been in operation since 2001 recording hourly PM_{10} and meteorological data, an analysis of these data using the reverse dispersion modeling methodology described in the Bonifacio study was undertaken to produce potentially more representative emission factors for these facilities.

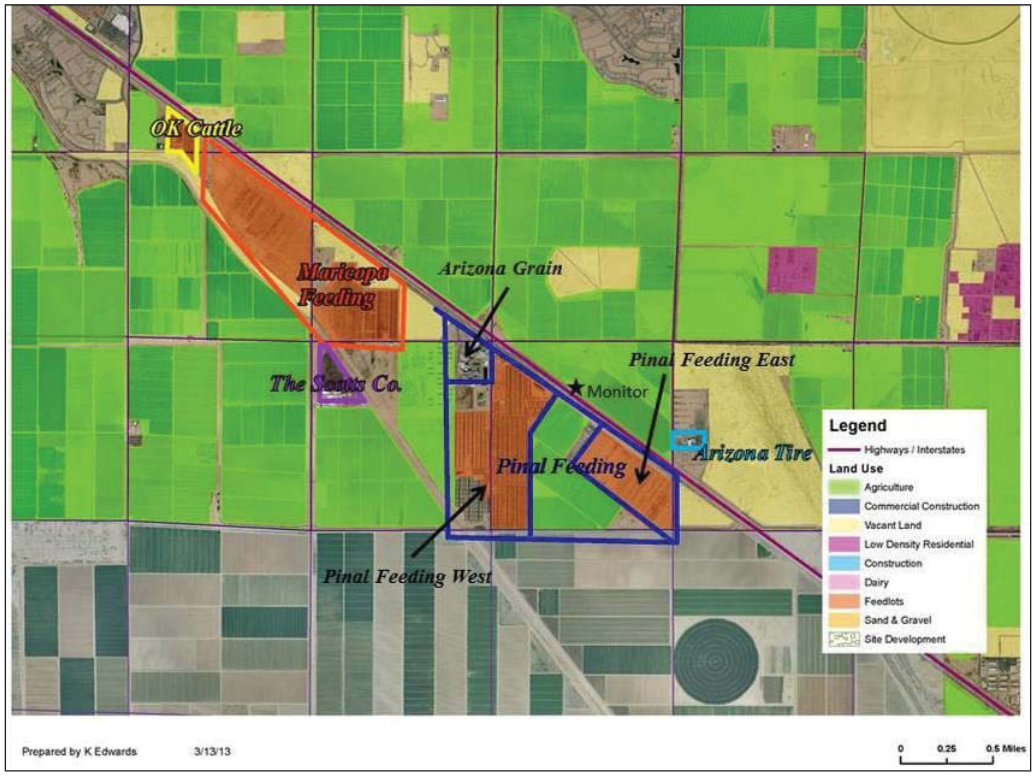
Feedlot Emission Isolation – In 2008, the Cowtown source complex consisted of seven feedlot pen areas, a grain mill, a tire recycling facility, a composting facility, and an ethanol plant. A map of these facilities and the monitoring station is presented in Figure 3-1. The feedlot pens closest to the monitoring station are operated by Pinal Feeding Company. In the 2008 baseline year, the company operated a feedlot 0.28 miles from the monitor in a south to southeasterly direction. This pen area, known as Pinal Feeding East (PFE), lay along one of the axes of prevailing low velocity nocturnal winds impacting the monitor and thus was identified as potentially significantly influencing PM_{10} concentrations at the monitor. Additionally, wind trajectories passing over the PFE

[20] Parnell, S.E., B.J. Lesikar, J.M. Sweeten and R.E. Lacey. 1994. "Determination of the Emission Factor for Cattle Feedyards by Applied Dispersion Modeling," presented at the June 19-22, 1994 International Summer Meeting, Paper No. 944042 (revised). ASAE, 2950 Niles Road, St. Joseph, MI 49085

[21] Bonifacio, H.F, R.G. Maghirang, B.W. Auvermann, E.B. Razote, J.P. Murphy, and J.P. Harner III, "Particulate matter emission rates from beef cattle feedlots in Kansas – Reverse dispersion modeling," JAW&MA 62(3)350-361, 2012.

[22] Ibid.

Figure 3-1
Cowtown Monitor, Feedlots, and Other Industrial Sources



pens to the monitoring station did not transport emissions from any of the other feedlot pens or other industrial facilities to the Cowtown monitor. These qualities suggested that the PFE pens represented the best feedlot source to analyze using reverse dispersion modeling techniques.

Although this approach did succeed in isolating the PFE emissions from those of other Cowtown industrial facilities, including other feedlots, non-industrial sources of PM_{10} near to and upwind of the PFE pens were recognized as also impacting the monitor and causing increased cumulative impacts when wind velocities were high enough to produce windblown PM_{10} emissions from disturbed soil surfaces. To eliminate this interference, the analysis of 2008 impacts was limited to hours in which wind speeds were below the threshold for soil entrainment, which was estimated to be 12 mph on an hourly average basis. During low wind hours, however, such sources as paved and unpaved road travel, locomotive exhaust, and agricultural operations were assumed to cumulatively add to PFE emission impacts as measured at the Cowtown monitor. During preliminary discussions with staff of the Pinal County Air Quality Control District (PCAQCD) on approaches to quantify the impacts of these other sources, Sierra Research learned that the PFE pens had been closed and demolished in the spring of 2010.[23] Since the monitoring record at Cowtown included hourly monitoring data for 2011 and 2012—years in which these other

[23] Teleconference with Sierra Research staff and contractor, Pinal County Air Quality Control District staff, and Arizona Department of Environmental Quality staff, June 13, 2013.

sources continued to operate in the absence of the PFE pens—the demolition of the PFE pens provided an opportunity to separately quantify the impacts of these other sources. The differences between the 2008 and the 2011/2012 impacts at the monitor represented the sole contributions from the PFE pens during 2008. This added benefit of selecting the PFE pens for feedlot emission analysis was believed to further reduce the confounding impact of other sources.

Basic Analytical Approach – In a reverse dispersion modeling analysis, air quality monitoring data are used to compute the emission rate of an upwind source in a process that is the reverse of typical source impact analysis. In source impact analysis, emissions from a source are estimated, and these emissions—together with stack information and meteorological data—are entered into a run file for a plume dispersion computer model. The source file is run by the model, resulting in estimates of pollutant concentrations occurring at specified downwind receptor sites. If, instead, an existing air quality monitor is designated as a downwind receptor site, and the pollutant concentrations measured at the monitor are assumed under appropriate wind directions to be due solely to emissions from an existing upwind source, the dispersion model can be used to back-calculate the emission strength of the source. The source emission rate in initial modeling is typically fixed over time at a unit value—such as 1 gm/sec—and the model is run to determine, hour by hour, the pollutant concentrations occurring at the monitor/receptor. The meteorological dataset used in this type of modeling is derived from locally collected hourly data covering one or more years. The dataset is filtered to include only those hours during which the wind direction requirements are satisfied. The resultant hourly pollutant concentrations forecasted by the model to occur at the monitor/receptor are then compared to the actual pollutant concentrations measured at the monitoring site, and the ratio of monitored concentration to modeled concentration is then multiplied by the unit emission rate assigned to the source to compute the estimated emission rate of the source. The basic equation that is used to perform this final step is shown below.

$$E' = E_0 \cdot (\xi'/\xi_0)$$

where:

E' = Back-calculated emission rate of source, g/sec
E_0 = Initial emission rate of source, g/sec
ξ' = Monitored pollutant concentration, $\mu g/m^3$
ξ_0 = Modeled pollutant concentration from source at initial emission rate, $\mu g/m^3$

Base Year Modeling – The modeling of PFE PM_{10} emission impacts at the Cowtown monitor was conducted using AERMOD, an EPA-approved model recommended for use with point and area industrial sources.[24] Meteorological files used by AERMOD were constructed using 2008 surface meteorological data collected at the Cowtown station and the Maricopa AZMET station,[25] and upper air data collected at Tucson, the closest site of

[24] Environmental Protection Agency, 2005, 40 CFR 51 Vol. 70, No. 216, pg. 68218, *http://www.epa.gov/scram001/guidance/guide/appw_05.pdf*
[25] The Cowtown meteorological data were not continuous through 2008. Data collected at the Maricopa AZMET station were used to fill in gaps in the Cowtown record for the periods of February 19 through

measured upper air data that is approximately 80 miles to the southeast of Cowtown. The coordinates of the PFE pen perimeter and the Cowtown monitoring station were identified from the online Google Earth program. From these coordinates, the total pen area of the PFE facility was calculated to be 292,667 m^2. A unit PM_{10} emission rate of 1.0 g/sec was assigned to the PFE facility, which converted to a unit-area emission rate of 3.417 $\mu g/m^2$-sec, and these emissions were assumed to be distributed uniformly across the facility and constant for every hour of 2008. From the Bonifacio study, the release height of PM_{10} emissions from livestock movement and on-site unpaved road travel was assumed to be 2.3 meters. Estimated hourly average PM_{10} concentrations at the Cowtown monitor were calculated by AERMOD for each hour of 2008 from this single area source. These data, together with the hourly meteorological PM_{10} data recorded at the monitor in 2008, were imported into a spreadsheet and merged into a single dataset by date and time stamp for analysis.

Initial Emission Factor Analysis – PM_{10} emissions from PFE pen activities significantly impact the Cowtown monitor when wind speeds are low and when wind directions carry these emissions directly from the pens to the monitor. Previous analysis of the relationships between PM_{10} concentrations and wind speeds at the monitoring stations designated for attainment demonstrations in the Inventory Preparation Plan indicated that wind entrainment of dust commenced in 2008 at a wind speed of approximately 12 mph (5.4 m/sec). To avoid the confounding impacts of windblown dust from upwind arrays of disturbed soil surfaces, an upper limit wind speed of 3.0 m/sec was selected for use in identifying hourly meteorological and PM_{10} monitoring data during which mechanically generated emission impacts, such as those generated by operation of the PFE facility, dominate PM_{10} concentrations measured at the Cowtown monitor.

Cowtown monitoring data collected in 2008 were further screened for hourly average wind directions associated with PFE emission impacts. Measurements taken from a Google Earth aerial photograph indicated that the boundaries of the PFE facility subtended a compass arc, as measured from the Cowtown monitor, ranging from 135 to 180 degrees. The dataset of 2008 monitoring data and modeled impacts was further filtered to include only this range of wind directions, and hours with missing data were removed. The remaining dataset was found to contain 1,802 hours that satisfied the specified meteorological conditions. During a series of sensitivity analyses, this dataset was further disaggregated into five different subsets based on various wind direction arcs. A map of the PFE facility and the five different wind arcs is shown in Figure 3-2.

April 25, 2008, and May 15 through September. 5, 2008. (Email from Scott DiBiase, PCAQCD, to Bob Dulla, Sierra Research, July 8, 2013.)

Figure 3-2
Cowtown Monitor, PFE Facility, and Wind Arcs

Legend (colors refer to lines perpendicular to wind directions):
Base Wind Arc Blue, 135-180 degrees (Table 3-5)
Narrow Wind Arc Red, 142.5-172.5 degrees (Table 3-6)
West Wind Arc Orange, 157.5-180 degrees (Table 3-7)
East Wind Arc Lt. Green, 135-157.5 degrees (Table 3-8)
East+ Dk. Green, 135-162.5 degrees (Table 3-9)

The Bonifacio paper and information received from Pinal Feeding Company representatives revealed that PM_{10} emission rates from feedlots varied dramatically from hour to hour on a diurnal basis. Maximum PM_{10} emissions rates are associated with peaks in cattle movement, which typically occurs within a few hours of feeding times. At the PFE facility, cattle were fed between 6:00 am and 3:00 pm, and significant in-pen movement occurred between 4:00 and 8:00 pm as cattle responded to digested feed energy release and the desire to find relief from peak daily temperatures.[26] Because of these significant fluctuations in hourly emissions, and the need to develop diurnal emission profiles for the 24-hour PM_{10} standard attainment demonstration, the filtered monitoring and modeling data were analyzed on an hour-of-day basis. The Bonifacio paper reported that hourly feedlot emissions rates over an annual period were not normally (i.e., bell curve) distributed, and that average values were best calculated using median instead of mean values. On the basis of the Bonifacio report, the analyses of the Cowtown monitoring and PFE modeling data used median values in the development of statistical relationships.

[26] Conference call with Bas Aja/Arizona Cattle Feeders Association and staff of the Arizona Department of Environmental Quality and Pinal County Air Quality Control District, May 13, 2013.

Table 3-5
Hour of the Day Percentiles of 2008 Monitored and Modeled PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Direction is between 135 and 180 Degrees (Base Arc) ($\mu g/m^3$)

Hour of the Day Percentiles of 2008 Cowtown Monitored PM10 When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 180 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	21	22	21	23	32	37	21	26	37	28	19	15	14	15	8	16	12	12	29	38	37	23	20	21
20%	32	36	42	51	58	71	67	43	47	36	25	21	23	19	13	23	15	22	39	95	62	44	40	40
30%	53	72	70	83	89	111	111	88	68	48	27	24	28	22	18	27	24	31	68	120	101	70	75	64
40%	85	125	91	104	116	152	135	165	93	62	36	31	30	25	22	30	37	39	107	247	183	99	105	115
50%	136	179	154	128	146	183	202	195	122	81	42	42	34	31	26	32	51	60	112	567	251	144	161	182
60%	195	229	209	164	177	218	237	226	145	93	52	48	35	41	33	37	51	82	231	754	421	242	200	220
70%	241	268	244	205	210	288	271	274	172	100	74	55	42	54	39	41	52	85	399	1021	483	294	251	267
80%	320	326	306	292	253	355	333	304	216	154	97	79	54	62	46	44	54	88	1040	1524	943	360	302	324
90%	393	461	418	377	336	443	393	353	252	270	123	100	70	84	55	45	59	317	1924	1994	1882	625	454	387
100%	1414	864	838	810	889	740	710	621	559	860	139	134	81	175	63	47	63	547	2159	3853	5457	2128	1355	736

Hour of the Day Percentiles of Modeled PM10 Impacts in 2008 at the Cowtown Monitor from the PFE Pen Facility
At 1.0 g/sec Emission Rate When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 180 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	8	6	6	7	7	5	4	1	1	1	1	1	1	1	1	1	1	2	3	9	9	7	9	8
20%	12	11	10	10	10	8	6	2	2	2	1	1	1	1	1	2	1	2	9	12	17	14	15	13
30%	20	13	14	13	14	12	8	4	2	2	1	1	1	1	1	2	1	2	14	18	28	19	22	17
40%	26	18	18	19	19	14	11	4	2	3	2	2	1	1	1	2	1	2	19	35	46	33	31	23
50%	32	28	22	25	24	20	20	6	3	3	2	2	1	1	1	2	1	3	34	51	57	45	39	29
60%	49	39	30	31	31	28	34	8	4	3	3	2	1	2	1	3	2	4	101	61	68	59	51	37
70%	63	47	45	46	39	35	45	26	5	4	4	2	2	2	1	3	2	67	119	92	77	78	72	57
80%	86	69	59	76	77	59	62	58	9	6	5	3	2	2	2	4	2	130	119	153	109	95	100	75
90%	127	100	127	140	132	120	128	92	17	9	6	3	3	2	2	4	2	150	124	179	136	126	136	103
100%	179	197	205	237	241	236	189	212	141	20	11	6	3	2	2	5	2	169	145	222	214	174	197	288

Ratio of Modeled to Monitored PM10 Percentiles by Hour of the Day at the Cowtown Monitor in 2008
When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 180 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	38.9%	26.4%	28.5%	28.6%	23.1%	13.9%	16.8%	4.7%	3.0%	4.5%	4.4%	6.1%	5.5%	5.4%	7.3%	7.6%	9.5%	13.5%	8.9%	22.8%	24.5%	32.9%	42.9%	38.0%
20%	36.9%	29.2%	22.6%	18.7%	17.1%	11.6%	8.6%	5.3%	3.5%	5.1%	4.3%	5.5%	4.4%	4.7%	5.6%	7.3%	8.2%	8.4%	23.1%	12.5%	27.6%	31.6%	37.9%	31.8%
30%	38.6%	18.4%	19.4%	15.4%	15.8%	10.5%	6.9%	4.0%	3.1%	3.9%	4.7%	6.0%	4.0%	4.9%	4.7%	7.0%	5.6%	6.1%	20.9%	14.8%	27.9%	26.9%	29.1%	26.2%
40%	30.2%	14.6%	19.4%	17.8%	16.6%	9.5%	8.2%	2.7%	2.6%	4.3%	4.4%	5.1%	3.8%	5.4%	4.1%	6.6%	3.6%	4.8%	18.0%	14.1%	25.3%	33.3%	29.8%	20.1%
50%	23.3%	15.5%	14.2%	19.3%	16.7%	11.2%	10.0%	3.0%	2.4%	3.5%	5.4%	4.1%	4.1%	4.5%	3.7%	6.2%	2.7%	4.9%	30.2%	9.1%	22.6%	31.4%	24.4%	15.9%
60%	25.0%	17.2%	14.3%	18.9%	17.7%	13.0%	14.2%	3.4%	2.7%	3.4%	6.0%	4.1%	4.2%	3.8%	3.5%	7.3%	3.0%	4.9%	43.8%	8.1%	16.1%	24.3%	25.5%	16.9%
70%	26.0%	17.4%	18.6%	22.4%	18.7%	12.1%	16.8%	9.6%	3.2%	4.1%	5.0%	4.1%	4.4%	3.1%	3.4%	8.1%	3.4%	79.3%	29.8%	9.0%	15.9%	26.6%	28.9%	21.4%
80%	26.8%	21.2%	19.2%	26.2%	30.6%	16.5%	18.7%	19.2%	4.0%	3.6%	5.4%	3.6%	3.9%	2.7%	3.2%	8.8%	3.4%	149%	11.4%	10.0%	11.6%	26.5%	33.1%	23.3%
90%	32.4%	21.7%	30.4%	37.0%	39.2%	27.2%	32.6%	26.0%	6.8%	3.3%	5.1%	3.2%	3.9%	2.3%	3.1%	9.5%	3.2%	47.2%	6.5%	9.0%	7.2%	20.2%	30.0%	26.5%
100%	12.6%	22.8%	24.5%	29.3%	27.1%	31.9%	26.7%	34.1%	25.3%	2.3%	7.7%	4.8%	3.8%	1.3%	3.0%	10.2%	3.0%	30.9%	6.7%	5.8%	3.9%	8.2%	14.5%	39.1%
Count	154	155	155	139	131	143	108	92	72	46	28	23	18	12	5	5	5	6	9	29	74	120	126	147
	1802	Total																						

The results of the initial comparison between monitored and modeled PM_{10} concentrations in 2008 at the Cowtown monitor are displayed in Table 3-5. The tables show that modeled PM_{10} concentrations are less, with one exception, than monitored PM_{10} concentrations. This indicates that the actual PM_{10} emission rate of the PFE facility is greater than the 1.0 g/sec default rate used in the modeling analysis. The grouping of higher PM_{10} values at night in both the monitored and modeled data confirm the influence of low mixing heights during nocturnal hours. The higher values shown in the monitoring data for the hours of 1900 to 2200 compared to values shown for the hours of 2300 through 0700 suggests that PFE emissions are substantially higher during this period than during the other hours of the night. This ratio is especially in contrast to the ratio of nocturnal values for the same hourly periods shown in the modeled data table. The suggestion of elevated emissions from the PFE facility during the middle evening conforms to the feedlot activity information provided by Pinal Feeding Company representatives.

Wind Direction Arc Sensitivity Analysis – Initial comparisons of median PM_{10} monitored concentrations by hour of the day for the 2008 and 2011/2012 years indicated that emissions from sources other than the PFE facility were significant in 2008 and contributed to approximately 40% of PM_{10} recorded at the monitor. In an attempt to determine the relative location of these other contributing sources, and also to test the consistency of the results shown in Table 3-5 and the sensitivity of these results to the selection of other wind direction arcs, three other wind direction arcs were initially analyzed in the 2008 Cowtown dataset.

In the first sensitivity analysis, the wind direction arc was reduced from a spread of 45 degrees (i.e., 135 to 180 degrees) to a spread of 30 degrees (i.e., 142.5 to 172.5 degrees). This reduced—or "Narrow"—arc was designed to reduce the influence of sources that abutted the edges of the PFE facility with respect to wind direction. Such sources would produce plumes that would overlap that of the PFE facility given the roughly 15 degree spread of emission plumes when dispersing downwind. By reducing the PFE wind direction arc by 7.5 degrees on each side, the intent was to reduce the influence that area sources adjacent to the PFE pens had on monitored PM_{10} concentrations.

Table 3-6 presents the results of the comparison between monitored and modeled PM_{10} concentrations in 2008 at the Cowtown monitor using hourly data filtered to this narrower wind direction arc. The tabular values in Table 3-6 are generally very similar to those shown in Table 3-5, except that the values for percentiles between the 10th and 50th[27] in the modeled data are higher by factors ranging from a few to over 200 percent. This result is somewhat expected as the wind direction arcs that were removed from consideration are those that lie over the east and west corners of the PFE facility where the pen areas contributing emissions are small in comparison to the area bounded by the

[27]Percentiles, as used in this analysis, represent the positions—in units of percent—of individual numbers in a series of numbers ranked from lowest to highest. The 10th percentile value of a set of numbers, for example, is the number that is larger than 10% of the numbers in the set and smaller than 90% of the numbers. The median, or 50th percentile, is the number that is larger than 50% of the numbers in a set and smaller than the other 50%. All percentiles were calculated using the Excel percentile.inc function.

Table 3-6
Hour of the Day Percentiles of 2008 Monitored and Modeled PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Direction is between 142.5 and 172.5 Degrees (Narrow Arc) ($\mu g/m^3$)

Hour of the Day Percentiles of 2008 Cowtown Monitored PM10 When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 142.5 and 172.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	24	20	26	25	32	49	23	29	30	29	24	14	15	19	8	34	11	10	27	131	41	22	21	21
20%	38	33	45	66	57	81	62	72	40	39	27	18	22	25	12	35	14	18	37	247	85	43	43	41
30%	61	56	74	84	80	119	110	109	56	54	31	23	28	34	17	36	16	26	50	285	121	67	81	78
40%	115	125	91	104	112	160	135	170	86	76	36	32	31	39	22	38	24	32	93	627	187	99	129	173
50%	163	176	133	126	134	192	182	202	122	89	43	46	35	44	26	39	34	39	183	922	277	137	169	210
60%	203	221	175	163	168	216	218	252	130	96	54	49	41	53	34	41	44	56	307	1021	435	195	206	246
70%	250	260	229	186	209	279	269	288	190	113	78	55	44	60	41	42	52	73	467	1651	644	288	259	280
80%	332	311	279	272	251	340	321	308	219	173	93	94	56	62	48	44	56	83	1315	1854	1006	360	302	331
90%	400	417	410	368	341	431	408	365	246	259	108	103	75	72	56	45	60	85	1953	2457	1879	689	456	389
100%	1414	764	766	739	889	740	710	621	559	860	137	134	81	87	63	47	63	88	2159	3853	5457	2128	1355	736

Hour of the Day Percentiles of Modeled PM10 Impacts in 2008 at the Cowtown Monitor from the PFE Pen Facility
At 1.0 g/sec Emission Rate When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 142.5 and 172.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	11	12	9	10	9	7	4	2	2	2	1	1	1	1	1	4	1	2	3	17	13	13	13	13
20%	19	15	14	14	13	11	7	4	2	2	2	1	1	1	1	4	1	2	7	37	25	25	23	19
30%	25	22	17	18	17	14	9	4	2	2	2	1	1	1	1	4	1	2	15	55	48	36	31	26
40%	30	29	21	24	21	20	18	6	3	3	2	2	1	2	1	4	1	2	30	61	58	47	39	33
50%	41	39	26	30	28	25	30	7	4	3	3	2	1	2	1	4	2	2	76	79	69	61	51	45
60%	54	45	41	43	39	31	44	9	5	3	3	2	2	2	2	4	2	53	118	95	76	78	68	62
70%	67	62	55	56	67	45	58	47	6	4	4	2	2	2	2	4	2	105	119	151	98	86	92	75
80%	86	78	91	97	92	90	78	65	10	5	5	3	2	2	2	5	2	138	119	169	126	111	121	88
90%	130	131	143	146	138	139	137	122	22	8	6	4	3	2	2	5	2	153	127	182	150	133	148	147
100%	179	197	205	237	241	236	189	212	141	20	11	6	3	2	2	5	2	169	145	222	214	174	197	288

Ratio of Modeled to Monitored PM10 Percentiles by Hour of the Day at the Cowtown Monitor in 2008
When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 142.5 and 172.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	46.5%	59.6%	33.4%	39.4%	28.7%	14.7%	16.6%	8.3%	5.4%	6.4%	5.8%	6.2%	7.1%	6.5%	13.8%	11.2%	9.9%	15.8%	9.4%	13.2%	31.8%	60.1%	59.5%	62.1%
20%	51.3%	47.1%	30.0%	20.7%	23.0%	13.7%	11.0%	4.9%	5.3%	4.9%	6.0%	7.6%	5.2%	5.6%	9.3%	11.1%	8.8%	9.7%	18.7%	15.1%	29.9%	57.9%	53.2%	46.6%
30%	41.4%	39.8%	23.4%	20.9%	21.2%	11.5%	8.0%	3.9%	4.3%	4.6%	6.4%	6.6%	4.4%	4.2%	7.3%	10.9%	8.0%	7.3%	31.1%	19.5%	39.6%	54.0%	38.9%	32.9%
40%	26.3%	22.8%	22.7%	23.4%	19.1%	12.6%	13.1%	3.3%	3.3%	3.6%	6.5%	4.9%	4.3%	3.8%	6.1%	10.8%	6.0%	5.8%	32.0%	9.7%	30.9%	47.2%	30.5%	19.2%
50%	25.3%	22.4%	19.8%	24.0%	20.8%	12.8%	16.7%	3.3%	3.2%	3.2%	6.5%	4.2%	4.1%	3.8%	5.3%	10.7%	4.7%	4.8%	41.4%	8.6%	24.9%	44.3%	30.0%	21.4%
60%	26.6%	20.5%	23.7%	26.4%	23.4%	14.4%	20.3%	3.6%	3.8%	3.4%	6.0%	4.2%	4.3%	3.2%	4.5%	10.6%	3.9%	94.8%	38.5%	9.3%	17.4%	39.7%	33.2%	25.3%
70%	26.7%	23.9%	23.8%	30.2%	31.8%	16.0%	21.5%	16.1%	3.3%	3.5%	5.1%	4.1%	4.6%	2.9%	3.9%	10.5%	3.5%	143%	25.4%	9.1%	15.3%	30.0%	35.5%	26.9%
80%	26.0%	24.9%	32.7%	35.8%	36.6%	26.4%	24.4%	21.2%	4.7%	2.9%	5.3%	3.3%	4.2%	3.1%	3.5%	10.4%	3.3%	166%	9.1%	9.1%	12.5%	30.7%	39.9%	26.5%
90%	32.5%	31.5%	34.9%	39.6%	40.6%	32.2%	33.7%	33.2%	8.8%	3.0%	5.6%	3.6%	3.7%	2.8%	3.2%	10.3%	3.1%	180%	6.5%	7.4%	8.0%	19.2%	32.4%	37.9%
100%	12.6%	25.8%	26.8%	32.1%	27.1%	31.9%	26.7%	34.1%	25.3%	2.3%	7.8%	4.8%	3.8%	2.6%	3.0%	10.2%	3.0%	193%	6.7%	5.8%	3.9%	8.2%	14.5%	39.1%
Count	123	108	110	97	97	95	76	62	47	34	16	19	9	7	3	2	4	5	8	17	58	89	99	94
	1279	Total																						

center 30 degree wind direction arc. The percentiles of PM_{10} impacts from the narrower but deeper (on average) emission area should be higher, over the range of wind directions modeled, than those of the wider but less deep (on average) emission area used in the baseline analysis. In the absence of results dramatically different from this general trend, we can assume that there were no significant area sources operating in the wind directions adjacent to those of the PFE facility used in the baseline analysis.

In the second and third sensitivity analyses, the wind direction arc bounding the PFE facility was split in half and the two complementary arcs were analyzed separately. The analysis began by splitting the baseline wind direction arc of 135 to 180 degrees in half along an azimuth of 157.5 degrees. The western portion of the PFE pens was represented by a wind direction arc of 157.5 to 180 degrees, and the eastern portion of the pens was represented by a wind direction arc of 135 to 157.5 degrees.

The results of the western half percentile analysis are presented in Table 3-7. One difference between the tabular values in the "West" arc analysis compared to those of the "Base" arc highlights a problem that occurs when there are very few database values found within a bin, such as occurs in 1600 hour bin. Within the "West" arc, the 2008 monitoring data contained only one hour in the 1600 hour subset that satisfied the prescribed meteorological conditions. With only one value in the subset, the percentile values from 10th percentile to 100th percentile do not change—all percentiles in this case are equal to the single monitored or modeled value represented by that hour. Ignoring this singularity, the other percentiles in the modeled "West" table are generally lower than those in the modeled "Base" table in Table 3-5, suggesting that some portion of high PM_{10} concentrations were recorded at the monitor when the wind direction was within the "East" half of the PFE arc.

The results of the eastern half percentile analysis are presented in Table 3-8. Within this wind direction arc, the 2008 dataset contained no hours in the 1700 hour column that satisfied meteorological conditions used in this analysis. In this situation, the tabular data simply reports "N/A" for all percentile values in this column. Comparison of the modeled-to-monitored ratios in Table 3-8 to the corresponding values in Table 3-7 suggests differences in source emissions within the "East" and "West" wind direction arcs. The ratio values in the "East" arc are higher than those of the "West" arc during the hours from 2200 through 1600, suggesting that lower non-PFE emissions are generated within the "East" arc during these hours in comparison to PFE emissions than occur in the "West" arc. As an example, to illustrate this relationship, during the 0100 hour, at the 50th percentile PM_{10} concentration recorded at the monitor during low wind conditions, the estimated emission rate of the sources within the "East" arc—when attributed entirely to the PFE pens—were 3.13 g/sec (= 1.0 gm/sec x 1/31.9%). However, in the "West" arc at the same time, the estimated emission rate when attributed entirely to the PFE pens was 5.52 g/sec (= 1.0 gm/sec x 1/18.1%). If the emission rate is uniform across the PFE pens at this hour of the early morning, as is suggested from discussions with Pinal Feeding Company representatives, then emissions from sources within the "West" arc other than the PFE facility are producing greater emissions than are estimated for other sources in the "East" arc.

Table 3-7
Hour of the Day Percentiles of 2008 Monitored and Modeled PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Direction is between 157.5 and 180 Degrees (West Arc) ($\mu g/m^3$)

	Hour of the Day Percentiles of 2008 Cowtown Monitored PM10 When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 157.5 and 180 Degrees																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	24	29	33	25	31	45	49	54	35	24	21	21	28	14	18	9	12	13	37	30	39	22	22	25
20%	36	51	60	64	68	80	99	96	47	33	32	22	31	17	20	9	15	24	41	111	57	47	49	46
30%	59	89	80	89	101	147	133	170	73	38	38	24	34	19	22	9	24	35	56	249	100	71	84	99
40%	118	133	98	104	117	180	174	207	96	42	43	25	38	21	24	9	37	48	81	513	185	95	131	163
50%	151	172	157	149	146	213	207	224	123	60	49	29	43	29	26	9	51	60	105	763	230	133	161	210
60%	193	195	198	166	168	243	257	261	138	91	61	39	53	38	34	9	51	73	108	929	305	224	188	255
70%	228	260	233	230	187	340	306	290	153	149	78	47	62	43	41	9	52	82	111	1049	695	312	232	295
80%	290	314	299	283	259	394	355	308	207	239	102	55	67	70	48	9	54	84	521	1299	1825	380	273	352
90%	394	404	373	339	331	486	429	361	234	273	137	90	74	113	56	9	59	86	1340	1792	2624	821	354	395
100%	1414	864	838	739	889	740	710	621	559	860	139	95	81	175	63	9	63	88	2159	2550	5457	2128	610	736

	Hour of the Day Percentiles of Modeled PM10 Impacts in 2008 at the Cowtown Monitor from the PFE Pen Facility At 1.0 g/sec Emission Rate When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 157.5 and 180 Degrees																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	7	3	5	5	5	4	2	1	1	1	1	1	1	1	1	1	1	1	2	5	6	6	8	5
20%	11	5	7	7	8	5	4	1	1	1	1	1	1	1	1	1	1	2	3	9	10	13	14	10
30%	17	10	10	11	13	8	4	2	2	1	1	1	1	1	1	1	1	2	5	14	15	17	20	16
40%	23	14	15	14	16	13	7	2	2	2	1	1	1	1	1	1	1	2	10	19	23	27	27	25
50%	27	20	19	18	19	20	9	3	2	2	1	1	1	1	1	1	1	2	16	34	41	41	36	32
60%	34	28	21	23	24	24	21	5	3	3	1	2	1	1	1	1	2	2	57	44	50	56	49	38
70%	51	37	27	27	35	31	46	7	4	3	2	2	1	2	1	1	2	15	98	55	65	70	59	59
80%	64	45	39	52	48	43	60	31	7	3	3	2	1	2	1	1	2	53	119	65	76	81	84	72
90%	80	68	61	78	92	65	79	81	10	4	4	2	1	2	1	1	2	92	119	84	95	93	101	89
100%	142	114	161	175	151	173	130	167	47	19	11	3	1	2	1	1	2	130	119	100	135	122	152	151

	Ratio of Modeled to Monitored PM10 Percentiles by Hour of the Day at the Cowtown Monitor in 2008 When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 157.5 and 180 Degrees																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	28.9%	11.7%	15.3%	19.5%	16.1%	8.0%	4.3%	1.3%	1.8%	2.8%	3.5%	4.2%	2.5%	5.7%	3.1%	8.3%	9.5%	11.7%	6.5%	18.2%	16.5%	25.3%	37.3%	22.1%
20%	30.2%	10.9%	12.1%	10.5%	11.5%	6.6%	3.6%	0.9%	2.3%	2.5%	2.7%	4.0%	2.5%	5.1%	3.3%	8.3%	8.2%	6.9%	6.3%	7.8%	17.3%	27.3%	27.6%	22.0%
30%	28.8%	11.6%	12.2%	12.0%	13.0%	5.1%	3.0%	0.9%	2.1%	3.4%	2.5%	3.9%	2.3%	4.7%	3.5%	8.3%	5.6%	5.1%	9.4%	5.6%	14.7%	24.4%	24.0%	16.5%
40%	19.1%	10.4%	15.6%	13.2%	13.5%	7.0%	3.9%	1.1%	1.8%	4.2%	2.5%	4.8%	2.3%	4.6%	3.6%	8.3%	3.6%	3.9%	12.9%	3.7%	12.4%	28.4%	20.4%	15.4%
50%	18.1%	11.9%	12.1%	12.4%	13.3%	9.2%	4.4%	1.3%	1.8%	3.8%	2.6%	5.0%	2.3%	4.1%	3.7%	8.3%	2.7%	3.1%	14.8%	4.4%	17.9%	30.8%	22.3%	15.1%
60%	17.4%	14.6%	10.5%	13.8%	14.6%	9.7%	8.3%	1.7%	2.1%	2.9%	2.3%	4.0%	2.0%	3.8%	3.2%	8.3%	3.0%	2.6%	52.7%	4.8%	16.5%	25.2%	25.9%	15.0%
70%	22.5%	14.3%	11.6%	11.9%	18.8%	9.0%	15.0%	2.5%	2.9%	1.9%	2.6%	3.6%	1.8%	3.8%	2.8%	8.3%	3.4%	17.9%	88.8%	5.3%	9.3%	22.6%	25.5%	19.9%
80%	22.2%	14.3%	13.0%	18.5%	18.5%	11.0%	16.9%	10.2%	3.1%	1.2%	2.5%	3.4%	1.6%	2.4%	2.6%	8.3%	3.4%	63.3%	22.8%	5.0%	4.2%	21.2%	30.6%	20.4%
90%	20.2%	16.9%	16.3%	22.9%	27.7%	13.3%	18.5%	22.3%	4.4%	1.4%	2.8%	2.5%	1.5%	1.6%	2.4%	8.3%	3.2%	107%	8.9%	4.7%	3.6%	11.3%	28.6%	22.5%
100%	10.0%	13.2%	19.3%	23.7%	16.9%	23.3%	18.4%	26.8%	8.5%	2.2%	7.7%	3.2%	1.4%	1.1%	2.2%	8.3%	3.0%	149%	5.5%	3.9%	2.5%	5.7%	25.0%	20.5%
Count	79	76	70	65	63	68	49	38	37	16	15	12	7	8	3	1	5	4	5	15	38	67	70	76
	887	Total																						

Table 3-8
Hour of the Day Percentiles of 2008 Monitored and Modeled PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Direction is between 135 and 157.5 Degrees (East Arc) ($\mu g/m^3$)

Hour of the Day Percentiles of 2008 Cowtown Monitored PM10 When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 157.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	20	20	18	21	38	27	21	20	38	31	20	14	10	24	7	28	N/A	75	87	61	54	32	20	21
20%	35	32	41	51	65	63	53	35	51	43	23	29	16	25	11	30	N/A	127	162	95	79	43	32	49
30%	48	63	67	76	89	95	106	70	73	57	25	42	21	26	15	32	N/A	180	236	110	135	73	63	63
40%	72	136	87	94	117	133	125	109	108	79	27	47	27	33	19	34	N/A	232	307	123	243	122	96	103
50%	130	196	159	118	160	170	153	168	127	83	28	51	30	43	23	38	N/A	285	376	219	405	171	175	139
60%	203	259	214	162	197	195	230	200	152	93	40	55	33	52	27	41	N/A	337	445	509	431	242	226	189
70%	253	285	253	188	223	269	269	262	194	100	61	71	35	59	31	44	N/A	390	628	790	469	283	302	234
80%	331	344	308	292	256	321	309	298	225	123	90	103	35	60	34	45	N/A	442	1040	1545	703	352	371	299
90%	392	483	432	380	339	402	366	335	313	239	108	111	44	62	38	46	N/A	494	1453	2185	1419	411	477	339
100%	1144	809	766	810	515	527	548	527	474	324	117	134	73	63	42	47	N/A	547	1865	3853	3206	1181	1355	699

Hour of the Day Percentiles of Modeled PM10 Impacts in 2008 at the Cowtown Monitor from the PFE Pen Facility
At 1.0 g/sec Emission Rate When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 157.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	10	11	9	9	8	9	6	3	2	2	2	1	1	1	1	2	N/A	21	19	11	22	11	9	9
20%	15	12	12	12	11	11	8	4	2	2	2	2	1	1	1	2	N/A	37	26	25	37	17	15	13
30%	25	17	15	18	15	13	9	5	2	2	3	2	1	1	1	2	N/A	53	32	45	53	31	25	17
40%	30	25	19	26	23	17	19	6	3	3	4	2	2	1	1	2	N/A	70	51	68	65	42	34	22
50%	41	39	28	33	27	23	26	7	3	3	4	2	2	2	1	3	N/A	86	76	122	71	46	42	26
60%	61	47	45	45	38	32	35	11	5	4	5	2	2	2	1	3	N/A	103	101	157	75	66	55	35
70%	85	66	56	57	55	40	44	41	5	5	5	3	2	2	2	4	N/A	119	121	172	124	106	104	55
80%	107	83	97	116	83	97	84	58	7	7	6	3	3	2	2	4	N/A	136	129	182	129	126	136	78
90%	140	154	148	156	151	139	146	84	17	9	7	3	3	2	2	4	N/A	152	137	193	154	145	162	132
100%	179	192	205	237	241	236	189	212	81	20	8	5	3	2	2	5	N/A	169	145	222	214	174	197	193

Ratio of Modeled to Monitored PM10 Percentiles by Hour of the Day at the Cowtown Monitor in 2008
When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 157.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	48.2%	55.5%	47.9%	41.1%	22.1%	32.1%	30.2%	16.6%	5.5%	6.0%	7.8%	10.3%	13.7%	5.4%	13.2%	6.9%	N/A	27.4%	22.3%	18.8%	40.0%	33.7%	45.8%	45.8%
20%	41.6%	37.9%	28.9%	23.2%	16.7%	17.6%	15.5%	11.5%	4.7%	4.4%	8.6%	5.6%	8.8%	5.4%	9.5%	6.6%	N/A	29.1%	15.8%	26.3%	46.8%	40.1%	47.2%	27.0%
30%	52.4%	26.5%	23.1%	24.0%	16.9%	13.6%	8.7%	6.7%	3.4%	4.1%	11.6%	4.4%	6.8%	5.3%	7.7%	6.3%	N/A	29.8%	13.4%	40.7%	38.9%	42.2%	39.5%	27.1%
40%	42.0%	18.1%	21.4%	28.1%	19.4%	13.1%	15.1%	5.3%	2.7%	3.6%	13.6%	4.4%	5.9%	4.4%	6.7%	6.8%	N/A	30.1%	16.5%	55.1%	27.0%	34.1%	35.7%	21.1%
50%	31.9%	20.0%	17.8%	28.0%	17.1%	13.6%	17.0%	4.1%	2.7%	3.8%	13.2%	4.3%	6.2%	3.6%	6.0%	7.5%	N/A	30.4%	20.2%	55.6%	17.4%	26.6%	24.2%	18.5%
60%	30.2%	18.0%	21.1%	27.7%	19.5%	16.5%	15.1%	5.7%	3.1%	4.4%	12.8%	4.2%	6.5%	3.1%	5.5%	8.1%	N/A	30.5%	22.8%	30.9%	17.4%	27.5%	24.1%	18.4%
70%	33.7%	23.2%	22.0%	30.5%	24.9%	14.7%	16.5%	15.6%	2.8%	5.1%	8.9%	3.8%	6.2%	2.9%	5.1%	8.6%	N/A	30.7%	19.3%	21.7%	26.5%	37.3%	34.5%	23.3%
80%	32.3%	24.2%	31.5%	39.7%	32.2%	30.3%	27.3%	19.6%	3.3%	5.5%	6.5%	3.1%	7.6%	3.1%	4.9%	9.2%	N/A	30.8%	12.4%	11.8%	18.4%	35.9%	36.8%	26.1%
90%	35.7%	31.8%	34.1%	41.0%	44.5%	34.5%	40.0%	24.9%	5.4%	3.9%	6.2%	3.1%	6.3%	3.3%	4.7%	9.7%	N/A	31%	9.4%	8.8%	10.9%	35.3%	34.0%	38.9%
100%	15.6%	23.8%	26.8%	29.3%	46.7%	44.8%	34.6%	40.1%	17.1%	6.2%	6.7%	4.1%	4.2%	3.5%	4.5%	10.2%	N/A	31%	7.8%	5.8%	6.7%	14.7%	14.5%	27.6%
Count	73	77	82	74	65	75	57	52	33	29	13	10	11	4	2	4	0	2	4	14	34	52	54	66
	887	Total																						

One of the implications of this finding relates to the question of what caused elevated PM_{10} concentrations during the early morning hours of October 29, 2008, for the Cowtown monitor.[28] One theory is that PM_{10} suspended in the air to a height of a quarter mile by an emissions spike at the PFE facility during the period of highest livestock movement on the previous late afternoon/early evening, settled out of the air during these later hours (0100 to 0400 hours) to impact the Cowtown monitor at far higher PM_{10} concentrations than would result from the very low emissions rates estimated to be generated at feedlots and other nearby area sources at this time of day. If the elevated concentrations recorded during the 0100 to 0400 hours on the morning of October 29, 2008—and several other early mornings found in the monitoring record—were due to deposition of suspended PM_{10} entrained in a cloud above the Cowtown area, then the contributions from this other "source" to impacts from the "West" and "East" portions of the PFE facility should be roughly equal. Since there are substantial differences in the contributions of non-PFE sources when winds blow from the "West" arc versus the "East" arc during these early morning hours, the differences cannot be due to the somewhat uniform impacts of deposition from an area-wide cloud of PM_{10}.[29] The differences in source strength between the "West" and "East" halves of the PFE pens plus nearby area sources discounts the possibility that the deposition of suspended PM_{10} would be responsible for any significant portion of these non-PFE impacts during these hours.

The lower emissions impact estimated for the "East" half of the PFE facility suggests that within the wind direction arc spanning this area, the contributions of other area sources are lower than those within the other wind direction arcs analyzed. Therefore, the correlation between monitored PM_{10} and modeled PM_{10} within this wind direction arc is more representative of emissions from the PFE facility and is less influenced by emissions from other sources. On this basis, the wind direction arc subtended by the "East" half of the PFE facility was tentatively selected for use in estimating diurnal feedlot emissions factors.

The monitoring dataset for this preferred wind direction arc suffers, however, from an absence of data representing hour 1700 during the 2008 inventory year. Using a dataset with this type of deficiency to compute diurnal emissions factors is problematical. As a result, an analysis of the wind directions recorded during hour 1700 at Cowtown when meteorological bounds were satisfied was conducted. Hourly monitoring data meeting these requirements are shown in Table 3-9.

This tabulation reveals that two hours of data representing the 1700 hour of the day could be included in the preferred wind direction arc dataset if the arc is extended from 135 to 162.5 degrees. This selection was made and the resulting wind direction arc is referred to as the "East+" PFE facility arc.

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[28] As previously noted, an analysis of the modeling domains for 10/29/08 and 10/30/08, presented in Exhibit 13, concluded that the mixture of emission sources located within the October 29th domain was sufficient to represent sources impacting the Cowtown monitor on October 30; therefore, CAFO emission factor estimates developed for 10/29/08 were used to quantify CAFO emissions on 10/30/08.

[29] Additional research is needed to confirm the extent of deposition.

Table 3-9 Monitoring Data for Cowtown Hours in 2008 When Wind Speed < 3.0 m/sec, Wind Direction is Between 135 and 180 degrees, and Hour of the Day = 1700							
						PM_{10} Concentrations ($\mu g/m^3$)	
Year	Month	Day	Hour	WSpd (m/sec)	WDir (degrees)	Monitored	Modeled
2008	1	23	1700	2.1	172	63.4	1.9
2008	8	16	1700	2.1	172	50.5	1.1
2008	9	31	1700	1.5	162	9.1	1.8
2008	9	7	1700	1.1	162	16.9	1.3
2008	10	17	1700	1.8	174	51.9	1.4

A comparison of 2008 monitored versus modeled PM_{10} percentiles at the Cowtown monitor using the "East+" wind direction arc as a filter is shown in Table 3-10. The tabular values for this arc are very similar to those for the "East" arc shown in Table 3-8, with the exceptions that hour 1700 is populated with non-zero values and the percentile values between the 10th and 50th in hour 1800 are considerably higher than those found in the "East" arc. This latter difference may be due entirely to the fact that the "East" arc includes two hours from the hour 1800 column while the "East+" arc includes three hours in this column. In percentile analysis, large changes can occur when data subsets are small (i.e., $n << 10$) and the number of elements (n) is modified.

Calculation of Feedlot Emission Rates Unadjusted for Other Source Emissions – PM_{10} emissions from the PFE facility were calculated from the ratios of 50th percentile values derived from the monitored and modeled PM_{10} concentrations at the Cowtown monitor under the five wind direction arc scenarios discussed above. For each scenario, the ratios of 50th percentiles for each hour in the diurnal profile were inverted and multiplied by the unit emission factor used in the modeling analysis to compute gross hourly emissions factors. "Gross emissions factors" in this sense refers to emission factors attributed to feedlot sources but unadjusted for the emissions contributions from other area sources within the same wind direction arc. The adjustment to eliminate these contributions from other unknown sources will be discussed later in this section.

In each of the "ratio" tables in Tables 3-5 through 3-10, the percent values represent the fractions of *monitored* PM_{10} concentrations represented by the impacts of *modeled* PM_{10} emissions generated at a unit emission rate (i.e., 1.0 g/sec) by the PFE facility during the same hours and under the same meteorological conditions recorded at the monitoring

Table 3-10
Hour of the Day Percentiles of 2008 Monitored and Modeled PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Direction is between 135 and 162.5 Degrees (East+ Arc) ($\mu g/m^3$)

Hour of the Day Percentiles of 2008 Cowtown Monitored PM10 When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 162.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	21	20	18	22	36	27	20	24	38	29	21	13	10	20	11	28	10	35	28	69	31	20	19	20
20%	32	34	34	47	67	64	38	34	48	43	24	15	16	23	19	30	11	48	43	99	63	42	34	36
30%	48	66	56	79	89	94	106	68	69	54	26	19	21	24	27	32	11	61	152	112	103	67	61	57
40%	71	152	75	96	118	135	131	100	92	79	27	30	27	26	34	34	12	74	261	160	207	102	90	102
50%	128	196	128	124	148	172	201	157	121	85	36	46	30	31	42	38	13	88	376	422	397	148	152	145
60%	194	259	197	156	183	207	228	190	146	95	46	49	33	38	46	41	14	179	490	717	430	220	218	208
70%	244	284	232	183	213	254	266	252	199	102	76	55	35	43	51	44	15	271	1178	999	470	271	267	253
80%	319	341	289	231	253	318	316	294	219	142	95	84	35	53	55	45	15	363	1865	1447	777	352	329	298
90%	388	470	403	370	337	393	368	332	273	256	113	107	44	60	59	46	16	455	2012	2044	1782	442	440	337
100%	1414	809	766	810	889	527	642	527	474	324	137	134	73	63	63	47	17	547	2159	3853	5457	1181	1355	699

Hour of the Day Percentiles of Modeled PM10 Impacts in 2008 at the Cowtown Monitor from the PFE Pen Facility
At 1.0 g/sec Emission Rate When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 162.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	11	11	9	9	9	9	6	3	2	2	1	2	1	1	1	2	1	29	24	12	20	11	9	10
20%	16	13	13	12	12	12	7	4	2	2	2	2	1	1	1	2	1	55	34	33	29	18	15	13
30%	25	18	17	18	16	14	9	4	3	3	2	2	1	1	1	2	1	80	76	49	51	33	25	19
40%	31	26	22	25	21	19	16	6	3	3	2	2	2	1	1	2	2	105	118	61	63	43	36	24
50%	47	36	27	30	27	24	25	7	4	3	3	2	2	2	1	3	2	130	119	87	71	52	46	30
60%	62	44	43	40	38	33	36	13	5	4	4	3	2	2	2	3	2	138	119	148	83	80	58	40
70%	79	62	55	52	60	45	46	50	6	5	5	3	2	2	2	4	2	146	119	165	122	101	102	57
80%	108	81	95	109	90	96	76	66	11	6	5	3	3	2	2	4	2	153	119	177	131	121	132	86
90%	139	145	145	151	147	145	138	119	22	9	6	5	3	2	2	4	2	161	132	192	154	141	152	142
100%	179	197	205	237	241	236	189	212	141	20	8	6	3	2	2	5	2	169	145	222	214	174	197	288

Ratio of Modeled to Monitored PM10 Percentiles by Hour of the Day at the Cowtown Monitor in 2008
When Wind Speed is Less than 3.0 m/sec and Wind Direction is Between 135 and 162.5 Degrees

%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	54.0%	55.1%	48.9%	40.2%	24.2%	33.9%	27.6%	12.8%	5.6%	6.4%	6.7%	11.4%	13.7%	6.1%	8.6%	6.9%	13.8%	82.8%	83.7%	17.0%	64.7%	54.9%	47.0%	47.5%
20%	51.1%	36.7%	39.4%	25.3%	17.5%	18.3%	18.8%	10.7%	5.0%	4.8%	6.6%	12.0%	8.8%	5.9%	5.6%	6.6%	13.3%	113%	77.8%	33.6%	45.1%	42.1%	44.8%	36.9%
30%	52.8%	27.9%	31.2%	23.0%	18.2%	14.8%	8.3%	6.5%	3.7%	4.9%	8.1%	10.7%	6.8%	5.9%	4.4%	6.3%	12.8%	130%	49.9%	43.4%	49.0%	49.2%	40.8%	33.4%
40%	43.6%	17.3%	28.6%	25.7%	18.1%	14.1%	11.9%	5.8%	3.2%	3.6%	8.8%	7.2%	5.9%	5.4%	3.8%	6.8%	12.4%	141%	45.2%	38.0%	30.2%	41.9%	40.1%	23.2%
50%	36.6%	18.4%	21.2%	24.5%	18.5%	14.1%	12.6%	4.7%	3.1%	3.8%	8.9%	5.0%	6.2%	4.9%	3.3%	7.5%	12.1%	149%	31.6%	20.6%	17.8%	35.5%	30.4%	20.8%
60%	32.2%	16.9%	21.7%	25.6%	21.0%	16.0%	15.6%	7.0%	3.4%	4.2%	8.1%	5.4%	6.5%	4.4%	3.2%	8.1%	11.8%	76.9%	24.3%	20.7%	19.4%	36.4%	26.4%	19.4%
70%	32.2%	21.8%	23.6%	28.7%	28.0%	17.7%	17.1%	19.8%	3.1%	4.9%	6.7%	5.6%	6.2%	3.9%	3.2%	8.6%	11.5%	53.7%	10.1%	16.5%	25.9%	37.4%	38.2%	22.7%
80%	33.8%	23.6%	32.9%	47.1%	35.5%	30.2%	23.9%	22.6%	4.9%	4.1%	5.7%	3.8%	7.6%	3.5%	3.1%	9.2%	11.2%	42.3%	6.4%	12.2%	16.9%	34.4%	40.2%	29.0%
90%	35.9%	30.9%	36.1%	40.8%	43.7%	36.9%	37.5%	35.9%	8.0%	3.5%	5.6%	4.7%	6.3%	3.4%	3.0%	9.7%	11.0%	35.4%	6.6%	9.4%	8.6%	31.9%	34.6%	42.3%
100%	12.6%	24.4%	26.8%	29.3%	27.1%	44.8%	29.5%	40.1%	29.8%	6.2%	5.7%	4.8%	4.2%	3.5%	3.0%	10.2%	10.8%	30.9%	6.7%	5.8%	3.9%	14.7%	14.5%	41.2%
Count	100	98	103	94	86	91	77	66	42	34	17	13	11	8	3	4	2	3	6	16	45	67	72	88
	1146	Total																						

station. For example, if the 50th percentile ratio at 1200 hours under the Base wind direction arc scenario is reported to be 4.1% (see Table 3-5), then the modeling results are suggesting that the PFE facility produces 4.1% of the average PM_{10} concentration recorded at the Cowtown monitor during this time of day and under the range of meteorological conditions specified, when the facility is generating PM_{10} emissions at the constant rate of 1.0 g/sec. The unit emission rate can be multiplied by the inverse of the 50th percentile ratio, equal to 24.4 (= 1/0.041), to estimate the emission rate which the PFE facility would have to achieve in order to be responsible for 100% of the average PM_{10} concentration recorded at the monitor. This equivalent emission factor would be 24.4 g/sec (= 24.4 x 1.0 g/sec).

The 50th percentile values of monitored PM_{10} in 2008 for each hour of the day under the meteorological conditions specified, the modeled PM_{10} impacts reported by the AERMOD model from the PFE facility operating at a unit emission rate, the ratios of these two sets of values, and the inverses of these ratios, are presented in Table 3-11 for each of the five wind direction arc scenarios analyzed.

The lowermost table in Table 3-11 reports unadjusted 50th percentile emission rates by hour of the day at the PFE facility in 2008 under the different scenarios analyzed. The highest emissions rates are attributed to the "West" half of the facility, and are considerably higher from 0100 to 2100 hours than either the "East" or "East+" portions of the facility. The "East+" portion is shown to have lower emissions rates than any other scenario with the exception of the "East" scenario, which has roughly equivalent emissions but continues to contain a data gap in hour 1700 for reasons discussed earlier. Because we are assuming that emissions across the PFE pens are roughly uniform, based on information received from company representatives, the lower rates shown for the "East+" portion suggest lower contributions at the Cowtown monitor from other sources lying within the same wind direction arc. For this reason, this wind direction arc is tentatively selected to represent unadjusted feedlot emission rates in the remainder of the analysis.

Other Source Emissions Analysis – Hourly meteorological and PM_{10} data collected at the Cowtown monitoring station in 2011 and 2012 were analyzed in the same manner as the 2008 data to determine the impacts of other sources within the 5 different wind direction arcs at a time when the PFE facility was closed and demolished. According to historical aerial photographs available through the Google Earth program, the PFE facility was torn down in the spring of 2010, so no feedlot emissions were being transported in 2011 and 2012 by winds blowing from azimuths between 135 to 180 degrees to the monitor.

PM_{10} concentration percentile values recorded at the Cowtown monitor in 2011 under the meteorological conditions specified for each wind direction arc scenario are displayed by hour of the day in Table 3-12. The patterns in each scenario are somewhat similar to each other and are also similar to the corresponding percentile tables for 2008, with the exception that the 2011 values are generally lower than those in the 2008 tables. The last table in Table 3-12 shows the 50th percentile PM_{10} concentrations by hour of the day for each of the five scenarios.

Table 3-11
Unadjusted PFE Emission Factors by Hour of the Day Based on 50th Percentiles of 2008 Monitored and Modeled PM_{10} at Cowtown Monitor Under Five Different Wind Direction Arc Calculation Scenarios

	2008 50th Percentile Values of Monitored PM10 by Hour of the Day for Five Wind Arc Scenarios, ug/m3																							
Scenario	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	136	179	154	128	146	183	202	195	122	81	42	42	34	31	26	32	51	60	112	567	251	144	161	182
Narrow	163	176	133	126	134	192	182	202	122	89	43	46	35	44	26	39	34	39	183	922	277	137	169	210
West	151	172	157	149	146	213	207	224	123	60	49	29	43	29	26	9	51	60	105	763	230	133	161	210
East	130	196	159	118	160	170	153	168	127	83	28	51	30	43	23	38	N/A	285	376	219	405	171	175	139
East+	128	196	128	124	148	172	201	157	121	85	36	46	30	31	42	38	13	88	376	422	397	148	152	145

	2008 50th Percentile Values of Modeled PM10 at Unit Emissions Rates by Hour of the Day for Five Wind Arc Scenarios, ug/m3																							
Scenario	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	32	28	22	25	24	20	20	6	3	3	2	2	1	1	1	2	1	3	34	51	57	45	39	29
Narrow	41	39	26	30	28	25	30	7	4	3	3	2	1	2	1	4	2	2	76	79	69	61	51	45
West	27	20	19	18	19	20	9	3	2	2	1	1	1	1	1	1	1	2	16	34	41	41	36	32
East	41	39	28	33	27	23	26	7	3	3	4	2	2	2	1	3	N/A	86	76	122	71	46	42	26
East+	47	36	27	30	27	24	25	7	4	3	3	2	2	2	1	3	2	130	119	87	71	52	46	30

	Ratios of 2008 50th Percentile Modeled PM10 to Monitored PM10 by Hour of the Day for Five Wind Arc Scenarios																							
Scenario	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	23%	15%	14%	19%	17%	11%	10%	3%	2%	3%	5%	4%	4%	4%	4%	6%	3%	5%	30%	9%	23%	31%	24%	16%
Narrow	25%	22%	20%	24%	21%	13%	17%	3%	3%	3%	6%	4%	4%	4%	5%	11%	5%	5%	41%	9%	25%	44%	30%	21%
West	18%	12%	12%	12%	13%	9%	4%	1%	2%	4%	3%	5%	2%	4%	4%	8%	3%	3%	15%	4%	18%	31%	22%	15%
East	32%	20%	18%	28%	17%	14%	17%	4%	3%	4%	13%	4%	6%	4%	6%	8%	N/A	30%	20%	56%	17%	27%	24%	18%
East+	37%	18%	21%	24%	18%	14%	13%	5%	3%	4%	9%	5%	6%	5%	3%	8%	12%	149%	32%	21%	18%	35%	30%	21%

	PM10 Emissions Rates for PFE-Area Sources by Hour of the Day for Five Wind Arc Scenarios, g/sec																							
Scenario	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	4.3	6.5	7.1	5.2	6.0	9.0	10.0	33.2	41.6	28.8	18.5	24.2	24.4	22.5	26.8	16.0	36.7	20.5	3.3	11.0	4.4	3.2	4.1	6.3
Narrow	4.0	4.5	5.1	4.2	4.8	7.8	6.0	30.1	31.0	30.8	15.4	23.8	24.6	26.5	18.7	9.3	21.4	20.8	2.4	11.7	4.0	2.3	3.3	4.7
West	5.5	8.4	8.3	8.0	7.5	10.9	22.5	75.3	54.7	26.6	38.6	19.9	44.2	24.2	26.8	12.0	36.7	32.3	6.8	22.6	5.6	3.2	4.5	6.6
East	3.1	5.0	5.6	3.6	5.8	7.4	5.9	24.2	36.8	26.4	7.6	23.5	16.2	27.9	16.7	13.3	N/A	3.3	4.9	1.8	5.7	3.8	4.1	5.4
East+	2.7	5.4	4.7	4.1	5.4	7.1	7.9	21.3	32.1	26.2	11.2	20.2	16.2	20.6	30.0	13.3	8.3	0.7	3.2	4.9	5.6	2.8	3.3	4.8

Table 3-12
Hour of the Day Percentiles of 2011 Monitored PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Directions Are Defined by the Five Wind Direction Arc Scenarios (µg/m³)

	2011 Base - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	20	18	18	12	17	17	23	52	28	23	19	18	13	10	9	15	21	10	32	47	42	29	26	23
20%	30	27	28	21	22	28	40	63	48	37	23	20	20	16	18	18	25	20	60	76	59	46	42	38
30%	41	34	35	33	33	36	48	72	67	48	27	26	25	17	23	21	34	26	73	97	71	56	58	47
40%	49	44	41	37	40	45	60	86	82	59	35	34	30	18	25	22	48	38	117	116	93	70	73	57
50%	58	52	49	46	45	57	72	100	102	65	39	38	33	27	27	22	56	61	136	157	130	87	90	67
60%	66	61	55	54	53	68	91	114	118	78	45	42	34	32	34	31	65	92	156	189	159	107	103	84
70%	79	68	66	70	66	83	111	136	133	95	53	54	45	37	44	39	68	124	192	403	203	124	125	102
80%	93	83	83	92	83	110	150	159	162	107	72	67	59	49	50	48	91	154	222	916	258	185	158	132
90%	128	116	105	157	124	140	217	220	209	133	103	124	124	72	70	60	127	209	252	1325	478	259	212	169
100%	708	346	262	658	543	546	943	396	353	386	238	203	191	92	112	73	134	283	724	2393	1421	1075	589	825
Count	158	147	159	147	164	156	148	133	130	94	50	41	30	18	16	7	9	14	23	36	75	95	125	156
	2131	Total																						
	2011 Narrow - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	19	17	18	17	17	21	22	52	35	25	20	20	13	11	11	19	20	6	24	47	44	27	24	31
20%	33	26	28	22	23	28	40	64	48	41	24	23	19	15	22	21	33	16	33	76	58	47	40	41
30%	40	32	36	33	35	36	46	77	62	51	27	33	21	16	25	22	47	21	60	85	70	56	57	47
40%	47	44	42	42	41	44	60	91	75	60	32	35	29	17	26	22	54	25	65	110	89	70	74	57
50%	55	53	49	49	47	56	70	103	94	72	38	38	32	25	27	29	62	31	93	122	105	85	93	65
60%	63	61	55	60	54	65	86	119	111	82	45	42	34	31	32	37	67	40	119	168	162	105	105	81
70%	76	68	69	73	66	81	108	138	129	96	51	52	38	33	41	44	69	70	130	189	202	123	123	96
80%	90	87	89	94	84	103	140	152	144	112	82	80	55	39	44	51	103	127	154	706	250	156	150	134
90%	122	122	126	152	114	128	206	200	182	134	104	137	124	49	50	62	128	159	248	1185	470	218	204	167
100%	369	346	201	345	543	546	706	281	353	386	238	203	191	74	70	73	134	283	259	2393	1298	1075	589	825
Count	99	104	111	102	126	101	94	90	94	62	35	30	20	10	12	6	8	10	16	21	51	74	96	113
	1485	Total																						
	2011 West - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	27	24	26	16	16	21	19	58	50	23	17	12	14	15	9	21	22	15	76	66	47	29	27	34
20%	37	28	34	23	23	35	42	68	90	34	27	19	21	16	10	24	33	23	111	107	57	45	48	41
30%	46	41	41	32	38	44	48	77	108	53	33	28	27	17	18	28	43	30	144	130	65	54	66	47
40%	48	46	45	37	41	56	62	98	117	61	38	34	31	18	21	31	48	43	159	159	94	78	80	64
50%	56	53	63	51	54	68	76	115	123	74	52	38	34	24	34	34	51	74	174	185	145	98	97	86
60%	65	67	69	66	67	90	88	139	133	91	68	43	35	31	44	37	54	131	192	651	179	119	125	121
70%	102	74	84	88	75	108	100	163	144	100	74	50	48	31	44	41	57	158	208	1013	223	202	166	148
80%	126	87	94	113	124	136	119	230	189	112	91	66	58	37	70	44	61	191	220	1295	400	263	195	176
90%	199	178	101	178	201	195	159	246	245	134	101	103	144	46	70	47	64	239	274	1683	547	306	240	191
100%	708	268	191	345	543	546	599	326	353	237	238	203	191	92	112	51	67	283	724	2393	1421	1075	589	825
Count	39	39	33	52	41	35	33	50	53	44	23	23	21	11	11	2	4	9	10	20	42	35	49	51
	730	Total																						

Table 3-12 (cont.)
Hour of the Day Percentiles of 2011 Monitored PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Directions Are Defined by the Five Wind Direction Arc Scenarios (µg/m³)

	2011 East - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	18	17	17	12	17	16	23	48	21	28	21	20	16	8	25	15	25	12	20	44	36	32	27	22
20%	30	26	25	21	22	28	40	62	41	40	23	21	18	13	25	19	26	19	32	59	67	46	40	38
30%	39	32	34	34	32	36	49	71	53	44	25	23	19	16	26	21	35	27	51	78	82	56	54	46
40%	50	43	40	39	40	42	59	83	66	55	28	33	22	25	26	22	52	37	64	85	92	67	72	56
50%	58	51	47	43	45	52	70	94	73	61	36	38	31	37	26	22	69	47	108	99	105	84	84	63
60%	66	60	52	52	52	65	95	107	91	70	40	41	32	45	27	28	91	67	126	122	133	101	98	76
70%	77	66	60	64	58	79	115	119	109	83	45	54	38	55	27	34	114	87	137	178	179	118	113	87
80%	89	82	76	71	73	103	157	140	136	103	49	100	51	67	32	44	127	102	201	282	232	146	134	116
90%	108	104	109	134	105	123	226	170	176	133	75	141	66	72	41	59	131	112	252	443	294	214	176	139
100%	369	346	262	658	223	407	943	396	248	386	222	175	67	74	50	73	134	122	259	706	1174	621	302	337
Count	119	108	126	96	123	121	116	84	77	50	27	18	9	7	5	5	5	5	13	16	33	60	76	105
	1404	Total																						
	2011 East+ - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	19	17	18	12	16	18	23	50	27	20	22	20	13	11	18	15	25	14	22	46	39	27	27	22
20%	30	26	27	21	22	28	40	64	45	37	23	22	17	15	25	19	32	20	32	73	60	44	40	38
30%	38	33	34	34	33	36	47	71	57	44	27	27	19	16	25	21	50	24	59	83	71	56	56	46
40%	49	44	41	39	40	43	59	85	71	56	31	34	24	16	26	22	61	33	68	101	93	67	71	57
50%	57	52	47	45	45	58	71	97	84	64	38	38	32	27	26	22	67	41	93	119	115	84	83	64
60%	64	60	52	53	53	67	95	108	102	72	44	40	33	37	27	28	68	57	121	155	153	100	99	77
70%	77	66	61	67	63	81	115	120	123	85	49	59	39	41	31	34	80	92	136	174	184	119	115	92
80%	89	80	76	79	82	106	156	144	136	107	67	73	54	55	41	44	114	112	180	292	228	144	138	119
90%	108	103	112	137	124	134	224	172	176	133	105	145	65	71	47	59	129	170	251	571	308	210	189	148
100%	369	346	262	658	543	546	943	396	248	386	238	203	67	74	50	73	134	283	259	1185	1174	621	589	337
Count	128	120	134	116	141	129	126	94	92	58	32	26	12	10	7	5	7	8	14	20	49	66	96	117
	1607	Total																						
	2011 50th Percentile Values by Hour of the Day for Different Calculation Methodologies																							
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	58	52	49	46	45	57	72	100	102	65	39	38	33	27	27	22	56	61	136	157	130	87	90	67
Nrrw	55	53	49	49	47	56	70	103	94	72	38	38	32	25	27	29	62	31	93	122	105	85	93	65
West	56	53	63	51	54	68	76	115	123	74	52	38	34	24	34	34	51	74	174	185	145	98	97	86
East	58	51	47	43	45	52	70	94	73	61	36	38	31	37	26	22	69	47	108	99	105	84	84	63
East+	57	52	47	45	45	58	71	97	84	64	38	38	32	27	26	22	67	41	93	119	115	84	83	64

Table 3-13 contains parallel tables of PM_{10} percentile values for 2012 that were constructed under the same approach as those for 2011. The 2012 values are similar to those for 2011, as can be seen by comparing the 50th percentile tables in Tables 3-12 and 3-13. In hours 0800-0900 and 1700-2100, 50th percentile values are slightly higher in 2011 than in 2012 under each scenario, but in the remainder of hours the values are roughly equivalent.

The slightly higher values in 2011 over 2012, when compared with the 2008 values, show a declining trend in PM_{10} concentrations at the Cowtown monitor over this period of time for the meteorological conditions specified. In comparing each of these two latter years to 2008, it would appear that the 2011 values better represent emissions from sources other than the PFE facility in 2008 than would the monitoring values from the 2012 dataset.

The 50th percentile of PM_{10} concentrations monitored at the Cowtown station by hour of the day and by scenario for 2008, 2011, and 2012 are displayed in the top three tables in Table 3-14. The ratios of the values from each of the 2011 and 2012 tables to the values shown in the 2008 50th percentile table are computed and presented in the two bottom tables in Table 3-14. Inspection of the ratio tables shows periodic irregularities in both the diurnal trends reading horizontally and the scenario trend reading vertically. These irregularities are primarily caused by the presence of very few hours of data in one or more arc scenarios during the late afternoon hours (i.e., 1600 to 1900 hours) when the wind roses for the Cowtown monitor show very low frequencies of wind blowing in the wind direction arcs subtending the PFE facility.

The 50th percentile values of PM_{10} impacting the Cowtown monitor from the PFE facility in 2008, by hour of the day and by arc scenario, could have been computed by deducting the fractional contributions of emissions from other sources, as shown in the two bottom tables in Table 3-14, from the 2008 50th percentile values of PM_{10} recorded at the monitor under each scenario. To do so, hour by hour, however, would have resulted in negative 50th percentile values for each hour and scenario combination that reported a value greater than 100% in either of the two ratio tables at the bottom of Table 3-14. Values above 100% in these tables result from the post-PFE shutdown PM_{10} concentrations monitored at the Cowtown station in 2011 or 2012 being higher than the pre-shutdown values for the same hour and scenario in 2008. Again, this anomaly is due to having too few hours (i.e., data points) in an hour-of-the-day column to produce a meaningful and representative percentile distribution.

The presence of these irregularities was overcome by computing hour-of-the-day average 50th percentile PM_{10} concentration and intra-year ratios for use in adjusting the 2008 data. Because the irregularities were present in hour-of-the-day columns with few data points, computing an hour-of-the-day average as an average of the 50th percentile values for each hour would have allowed the inordinately high—and sometimes low—values in the columns with irregularities to skew the result. To reduce the impact of these anomalous values, the 50th percentile PM_{10} values and ratios were weighted by the numbers of data points (hours) within that hour of the day count. This makes sense as the objective is

Table 3-13

Hour of the Day Percentiles of 2012 Monitored PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Directions Are Defined by the Five Wind Direction Arc Scenarios ($\mu g/m^3$)

	2012 Base - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	28	20	18	20	19	23	26	27	28	24	13	9	9	7	2	7	9	16	23	32	37	30	26	25
20%	42	31	28	26	25	33	38	47	38	40	20	14	11	13	9	9	16	32	30	57	75	52	53	35
30%	51	39	37	34	38	42	51	59	51	46	25	20	13	14	10	15	23	33	36	77	106	70	72	51
40%	59	46	46	41	42	49	59	71	70	61	35	27	16	18	18	16	26	35	53	104	114	91	86	64
50%	68	52	56	45	49	56	69	80	81	66	47	37	18	20	22	18	27	39	78	135	145	108	93	73
60%	76	61	64	52	59	61	79	90	92	72	52	42	23	23	25	23	34	44	107	348	169	120	102	83
70%	86	72	79	61	65	72	89	112	107	82	64	52	38	27	28	29	37	48	131	433	196	140	114	99
80%	102	83	92	69	79	90	114	134	135	95	84	70	43	32	41	34	44	52	172	513	225	168	144	116
90%	147	107	124	91	124	139	158	207	184	114	112	84	49	63	80	36	53	136	367	617	343	230	169	176
100%	488	338	328	206	414	601	634	395	253	201	195	101	126	74	125	43	53	191	402	1087	1376	1099	303	385
Count	164	181	169	163	161	155	152	140	99	81	68	41	24	23	23	16	9	12	19	28	74	108	136	171
	2217	Total																						
	2012 Narrow - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	28	20	18	21	19	22	21	27	27	34	11	10	9	12	1	11	8	14	21	37	45	40	30	21
20%	42	31	27	29	23	32	31	41	37	44	17	14	11	14	5	14	9	28	28	66	78	55	53	35
30%	49	43	37	39	35	41	49	57	55	55	23	23	12	15	9	15	12	32	34	86	104	77	67	54
40%	58	47	45	44	42	46	57	71	70	63	31	27	16	17	10	16	16	35	41	128	119	92	85	66
50%	68	54	55	48	49	55	65	81	84	68	45	35	21	19	12	16	21	39	75	185	145	107	95	76
60%	76	66	64	53	59	59	76	104	92	75	52	43	29	22	22	18	23	43	103	372	179	118	103	88
70%	84	73	80	61	65	71	89	119	107	85	61	51	42	26	24	22	26	47	128	491	195	136	116	100
80%	102	86	94	69	79	86	112	137	135	97	84	70	44	28	26	30	32	50	184	567	212	169	144	116
90%	154	142	124	93	119	127	148	214	185	112	101	84	56	64	28	35	43	66	371	680	360	231	169	162
100%	371	338	328	206	370	601	634	321	250	196	165	101	126	73	125	37	53	191	402	1087	1376	1099	303	314
Count	115	121	118	108	113	95	93	97	70	57	43	25	20	12	13	7	5	10	17	22	51	77	102	103
	1494	Total																						
	2012 West - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	28	21	22	20	18	30	21	30	34	19	17	10	7	7	7	7	23	32	29	30	57	39	28	18
20%	37	27	32	33	22	34	33	47	40	26	24	15	10	13	9	9	25	33	35	53	81	53	45	26
30%	49	39	42	40	31	44	48	66	63	39	31	17	14	19	10	15	26	33	52	118	111	79	56	32
40%	52	45	51	48	38	52	60	74	86	48	36	22	16	20	18	21	29	38	76	238	133	108	76	42
50%	66	56	56	52	46	59	72	83	98	59	48	26	16	21	26	24	32	46	78	438	148	116	85	56
60%	75	71	67	55	64	67	82	99	107	66	51	33	26	23	28	28	34	48	88	485	171	136	101	67
70%	87	73	82	62	73	78	94	126	136	72	57	45	39	27	29	33	38	50	116	528	212	160	124	91
80%	103	82	123	76	79	102	114	174	184	85	64	60	43	31	54	34	43	52	158	585	289	214	153	123
90%	130	120	171	100	113	184	155	209	211	99	100	73	48	69	91	36	48	108	230	708	343	311	198	178
100%	217	226	224	173	249	304	533	395	250	196	192	101	126	74	125	37	53	191	363	1087	1376	888	303	385
Count	47	39	32	38	37	34	40	52	36	39	27	20	12	12	18	10	4	7	9	17	31	45	38	49
	693	Total																						

Table 3-13 (cont.)
Hour of the Day Percentiles of 2012 Monitored PM_{10} at Cowtown Monitor When Wind Speed is Less Than 3.0 m/sec and Wind Directions Are Defined by the Five Wind Direction Arc Scenarios (µg/m³)

	2012 East - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	29	21	17	20	19	22	27	27	27	42	14	9	11	9	2	8	8	13	23	51	25	24	25	30
20%	42	32	27	26	26	33	40	48	34	47	18	13	11	13	3	14	9	14	26	65	49	55	57	47
30%	54	40	35	32	38	41	51	59	49	61	24	30	14	14	7	15	13	19	32	67	100	70	77	60
40%	62	46	45	39	43	46	58	71	66	66	35	37	17	15	14	16	20	28	42	77	111	86	87	69
50%	68	52	55	44	49	55	69	78	73	71	46	39	21	16	21	16	26	37	79	81	124	98	93	78
60%	77	60	64	51	56	59	78	88	82	78	54	49	22	22	21	16	31	39	118	106	161	110	102	88
70%	86	71	78	60	63	71	88	107	94	87	67	58	33	27	21	18	36	40	136	134	191	126	113	100
80%	98	83	88	69	79	88	113	128	117	102	85	74	42	32	22	19	41	62	202	233	203	150	139	115
90%	160	107	113	85	122	137	158	183	146	125	129	84	48	40	23	31	47	103	386	341	283	171	167	162
100%	488	338	328	206	414	601	634	317	253	201	195	101	126	68	25	43	53	145	402	378	886	1099	250	314
Count	117	143	137	125	124	121	113	88	63	42	41	21	12	11	5	6	5	5	10	11	43	63	98	122
	1526	Total																						
	2012 East+ - Hour of the Day																							
%tile	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
10%	28	20	17	21	19	22	27	27	26	26	12	9	10	10	3	8	9	14	18	58	30	27	30	30
20%	42	32	27	26	25	32	40	47	34	44	18	11	11	14	5	14	10	18	25	67	56	57	57	47
30%	52	40	37	34	38	41	52	59	48	56	24	25	13	15	8	15	15	29	32	79	95	70	78	59
40%	62	47	46	41	43	46	58	70	66	64	34	34	18	17	14	16	21	35	45	106	111	87	86	67
50%	68	53	56	44	50	53	68	79	76	69	42	38	21	21	21	16	23	37	75	135	124	103	95	77
60%	78	62	63	51	58	59	77	92	91	76	52	44	29	23	21	16	26	39	115	233	154	115	103	87
70%	87	72	76	59	63	71	88	110	104	85	66	54	42	27	22	18	32	43	139	360	184	125	114	98
80%	104	83	88	69	78	89	111	132	120	101	84	72	49	30	23	19	38	50	280	392	201	159	143	113
90%	159	107	120	87	119	138	152	203	147	124	112	84	95	38	24	31	46	89	380	512	273	177	167	162
100%	488	338	328	206	414	601	634	317	253	201	195	101	126	68	25	43	53	145	402	580	886	1099	303	314
Count	128	156	152	144	139	137	127	105	79	55	48	23	15	14	7	6	6	7	13	16	47	74	114	133
	1745	Total																						
	2012 50th Percentile Values by Hour of the Day for Different Calculation Methodologies																							
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	68	52	56	45	49	56	69	80	81	66	47	37	18	20	22	18	27	39	78	135	145	108	93	73
Nrrw	68	54	55	48	49	55	65	81	84	68	45	35	21	19	12	16	21	39	75	185	145	107	95	76
West	66	56	56	52	46	59	72	83	98	59	48	26	16	21	26	24	32	46	78	438	148	116	85	56
East	68	52	55	44	49	55	69	78	73	71	46	39	21	16	21	16	26	37	79	81	124	98	93	78
East+	68	53	56	44	50	53	68	79	76	69	42	38	21	21	21	16	23	37	75	135	124	103	95	77

Table 3-14
50th Percentile PM_{10} Concentrations Monitored at the Cowtown Station by Hour of the Day and By Wind Direction Arc Scenario for 2008, 2011, and 2012 ($\mu g/m^3$)

2008 50th Percentile Values of Monitored PM10 by Hour of the Day for Different Wind Arc Scenarios, ug/m3

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	136	179	154	128	146	183	202	195	122	81	42	42	34	31	26	32	51	60	112	567	251	144	161	182
Nrrw	163	176	133	126	134	192	182	202	122	89	43	46	35	44	26	39	34	39	183	922	277	137	169	210
West	151	172	157	149	146	213	207	224	123	60	49	29	43	29	26	9	51	60	105	763	230	133	161	210
East	130	196	159	118	160	170	153	168	127	83	28	51	30	43	23	38	N/A	285	376	219	405	171	175	139
East+	128	196	128	124	148	172	201	157	121	85	36	46	30	31	42	38	13	88	376	422	397	148	152	145

2011 50th Percentile Values of Monitored PM10 by Hour of the Day for Different Wind Arc Scenarios, ug/m3

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	58	52	49	46	45	57	72	100	102	65	39	38	33	27	27	22	56	61	136	157	130	87	90	67
Nrrw	55	53	49	49	47	56	70	103	94	72	38	38	32	25	27	29	62	31	93	122	105	85	93	65
West	56	53	63	51	54	68	76	115	123	74	52	38	34	24	34	34	51	74	174	185	145	98	97	86
East	58	51	47	43	45	52	70	94	73	61	36	38	31	37	26	22	69	47	108	99	105	84	84	63
East+	57	52	47	45	45	58	71	97	84	64	38	38	32	27	26	22	67	41	93	119	115	84	83	64

2012 50th Percentile Values of Monitored PM10 by Hour of the Day for Different Wind Arc Scenarios, ug/m3

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	68	52	56	45	49	56	69	80	81	66	47	37	18	20	22	18	27	39	78	135	145	108	93	73
Nrrw	68	54	55	48	49	55	65	81	84	68	45	35	21	19	12	16	21	39	75	185	145	107	95	76
West	66	56	56	52	46	59	72	83	98	59	48	26	16	21	26	24	32	46	78	438	148	116	85	56
East	68	52	55	44	49	55	69	78	73	71	46	39	21	16	21	16	26	37	79	81	124	98	93	78
East+	68	53	56	44	50	53	68	79	76	69	42	38	21	21	21	16	23	37	75	135	124	103	95	77

Ratio of 2011 to 2008 50th Percentile Values of Monitored PM10 by Hour of the Day fcr Different Wind Arc Scenarios

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	43%	29%	32%	36%	31%	31%	35%	51%	83%	81%	92%	90%	97%	87%	102%	68%	112%	100%	121%	28%	52%	60%	56%	37%
Nrrw	34%	30%	37%	39%	35%	29%	38%	51%	77%	80%	89%	83%	89%	56%	102%	74%	183%	80%	51%	13%	38%	62%	55%	31%
West	37%	31%	40%	35%	37%	32%	36%	51%	100%	123%	107%	131%	79%	83%	130%	383%	102%	123%	165%	24%	63%	73%	60%	41%
East	45%	26%	30%	37%	28%	31%	46%	56%	57%	74%	127%	76%	102%	86%	116%	58%	N/A	17%	29%	45%	26%	49%	48%	45%
East+	45%	26%	37%	36%	30%	34%	35%	62%	70%	75%	106%	83%	104%	85%	62%	58%	515%	47%	25%	28%	29%	56%	55%	44%

Ratio of 2012 to 2008 50th Percentile Values of Monitored PM10 by Hour of the Day for Different Wind Arc Scenarios

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	50%	29%	36%	35%	34%	30%	34%	41%	66%	82%	111%	87%	54%	65%	81%	57%	54%	65%	69%	24%	58%	75%	58%	40%
Nrrw	42%	31%	41%	38%	37%	28%	36%	40%	69%	76%	105%	76%	58%	44%	47%	42%	61%	100%	41%	20%	52%	78%	56%	36%
West	43%	33%	36%	35%	31%	27%	35%	37%	80%	98%	98%	89%	38%	73%	97%	272%	62%	75%	74%	57%	64%	87%	53%	27%
East	53%	26%	34%	37%	31%	32%	45%	47%	57%	85%	165%	78%	67%	39%	93%	42%	N/A	13%	21%	37%	31%	57%	53%	56%
East+	53%	27%	44%	36%	34%	31%	34%	51%	63%	82%	115%	83%	68%	68%	50%	42%	180%	43%	20%	32%	31%	69%	62%	53%

to compute the average change in PM_{10} concentration over all of the data points recorded, and not discount the contributions of large numbers of data points by virtue of their densities within the hours of the day recording high frequencies of winds blowing toward the monitor.

The hour-of-the-day average 50th percentile PM_{10} concentrations for each arc scenario in each of 2011 and 2012, using an unweighted average-of-hour-percentile method and an hourly count-weighted method for averaging, are displayed in Table 3-15.

Focusing on the "East+" data, the contributions of non-PFE sources to PM_{10} concentrations recorded at the Cowtown monitor in 2008 under the specified meteorological conditions were computed to be 40% in 2011, the year in which sources emitting within the prescribed arc most resembled those impacting the monitor in 2008. Applying this reduction factor to the weighted average 50th percentile PM_{10} concentration of 159 $\mu g/m^3$ for the "East+" scenario produces an adjusted monitored 50th percentile PM_{10} concentration at the Cowtown monitor of 95.4 $\mu g/m^3$ resulting solely from PFE facility emissions in 2008 under the specified meteorological conditions.

Table 3-15
Hour of the Day Average 50th Percentile PM_{10} Concentration

Arc Scenario	Unweighted Avg. ($\mu g/m^3$)	Weighted Avg. ($\mu g/m^3$)	Fraction of Weighted 2008 Value
2008 Monitored PM_{10}			
Base	136	162	N/A
Narrow	155	169	N/A
West	146	172	N/A
East	150	160	N/A
East+	143	159	N/A
2011 Monitored PM_{10}			
Base	67	69	42%
Narrow	62	66	39%
West	77	82	48%
East	60	62	39%
East+	61	64	40%
2012 Monitored PM_{10}			
Base	62	67	41%
Narrow	63	69	41%
West	75	77	45%
East	58	65	41%
East+	60	66	41%

For 24-hour attainment demonstration purposes, the hour-of-the-day PM_{10} emission rates for the PFE facility were calculated using this general approach. The 50th percentile PM_{10} concentrations monitored in 2008 at the Cowtown station and computed on an hour-of-the-day basis under the different arc scenarios were reduced by the count-weighted fractions shown in Table 3-15 for the 2011 monitored data. The count-weighted fractions were applied uniformly across all hours of the day, in the absence of accurate hour-specific reduction fractions, and the resulting adjusted 2008 monitoring data were compared to the 2008 modeling results for the PFE facility configured with a unit emission rate. The resulting ratios between modeled 50th percentiles and adjusted-monitored 50th percentiles were inverted and multiplied by the unit emission rate (1.0 gm/sec) to derive hour of the day 50th percentile emission rates for the PFE facility in 2008. The results of these calculations are presented in Table 3-16.

The first table in Table 3-16 shows the 50th percentile values of all 2008 monitored PM_{10} concentrations that remained after filtering for the specified meteorological conditions in each arc scenario. The second table shows the same data reduced by the weighted fractions of 2011 to 2008 monitored PM_{10} data by arc scenario shown in Table 3-15. The third table in Table 3-16 presents the 50th percentile PM_{10} concentrations reported by the modeling of PFE emissions when configured with a unit emission rate. The fourth table displays the ratios of the 50th percentiles of PFE modeled impacts to adjusted 2008 monitoring PM_{10} concentrations. Finally, the fifth table shows the unit emission rate multiplied by the inverse of the ratios contained in the fourth table. These data in the fifth table represent the 50th percentile PM_{10} emissions rates by hour of the day under each of the five wind arc scenarios for the PFE facility in 2008. A diurnal plot of the hourly PM_{10} emissions rates in different groupings of wind arc scenarios is shown in the upper half of Figure 3-3.

The 50th percentile PM_{10} emissions rates by hour of the day were converted to daily emissions factors by averaging the hourly values over the 24-hour diurnal period, converting the 24-hour average from units of g/sec to g/day, and then dividing the 24-hour emission rate by the number of cattle housed in the PFE facility in 2008. The number of cattle housed in 2008 was reported by Pinal Feeding Company representatives to have been 18,900 head. The resulting PFE PM_{10} emissions rates in units of pounds of PM_{10} emitted per head-day are tabulated in Table 3-17.

Given the close correspondence of the annual per-head-day emission rate calculated under the East and East+ scenarios in this analysis to that published by Bonifacio, use of either of these factors is recommended for attainment demonstration purposes in western Pinal County. Because of the larger sample size in the development of the emission factor the East+ scenario factor of 0.066 lb/head-day was selected for use in modeling at the Cowtown monitor.

Table 3-16
Calculation of Adjusted PFE Facility PM_{10} Emissions Rates in 2008 by Hour of the Day and by Wind Direction Arc Scenario

2008 50th Percentile Values of Monitored PM10 by Hour of the Day for Different Wind Arc Scenarios, ug/m3

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	136	179	154	128	146	183	202	195	122	81	42	42	34	31	26	32	51	60	112	567	251	144	161	182
Nrrw	163	176	133	126	134	192	182	202	122	89	43	46	35	44	26	39	34	39	183	922	277	137	169	210
West	151	172	157	149	146	213	207	224	123	60	49	29	43	29	26	9	51	60	105	763	230	133	161	210
East	130	196	159	118	160	170	153	168	127	83	28	51	30	43	23	38	N/A	285	376	219	405	171	175	139
East+	128	196	128	124	148	172	201	157	121	85	36	46	30	31	42	38	13	88	376	422	397	148	152	145

2008 50th Percentile Values of Monitored PM10 by Hour of the Day Adjusted for Other Source Emissions Under Different Wind Arc Scenarios, ug/m3

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	78	103	89	74	84	105	116	112	71	47	24	24	19	18	15	19	29	35	65	327	144	83	93	105
Nrrw	99	107	81	77	81	116	110	123	74	54	26	28	22	27	16	24	20	24	111	561	168	83	103	128
West	79	89	82	78	76	111	108	117	64	31	25	15	22	15	14	5	26	32	55	398	120	69	84	109
East	80	121	98	73	98	104	94	103	78	51	17	31	19	26	14	23	N/A	175	231	134	249	105	108	85
East+	77	117	77	74	88	103	120	94	72	51	22	28	18	19	25	23	8	52	225	252	238	89	91	87

2008 50th Percentile Values of Modeled PM10 at Unit Emissions Rates by Hour of the Day for Different Wind Arc Scenarios, ug/m3

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	32	28	22	25	24	20	20	6	3	3	2	2	1	1	1	2	1	3	34	51	57	45	39	29
Nrrw	41	39	26	30	28	25	30	7	4	3	3	2	1	2	1	4	2	2	76	79	69	61	51	45
West	27	20	19	18	19	20	9	3	2	2	1	1	1	1	1	1	1	2	16	34	41	41	36	32
East	41	39	28	33	27	23	26	7	3	3	4	2	2	2	1	3	N/A	86	76	122	71	46	42	26
East+	47	36	27	30	27	24	25	7	4	3	3	2	2	2	1	3	2	130	119	87	71	52	46	30

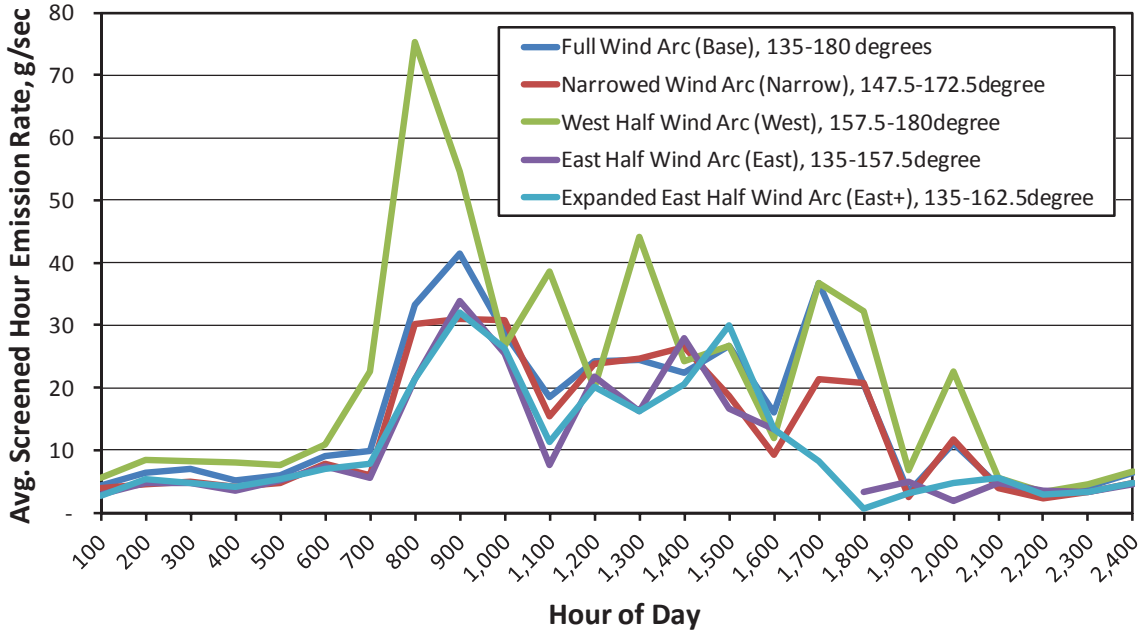
Ratio of 2008 Modeled to Adjusted Monitored 50th Percentile PM10 Values by Hour of the Day for Different Wind Arc Scenarios

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	40%	27%	25%	34%	29%	19%	17%	5%	4%	6%	9%	7%	7%	8%	6%	11%	5%	8%	52%	16%	39%	54%	42%	28%
Nrrw	42%	37%	32%	40%	34%	21%	28%	5%	5%	5%	11%	7%	7%	6%	9%	18%	8%	8%	68%	14%	41%	73%	49%	35%
West	35%	23%	23%	24%	25%	18%	9%	3%	4%	7%	5%	10%	4%	8%	7%	16%	5%	6%	28%	8%	34%	59%	43%	29%
East	52%	33%	29%	46%	28%	22%	28%	7%	4%	6%	22%	7%	10%	6%	10%	12%	N/A	49%	33%	90%	28%	43%	39%	30%
East+	61%	31%	35%	41%	31%	24%	21%	8%	5%	6%	15%	8%	10%	8%	6%	13%	20%	249%	53%	34%	30%	59%	51%	35%

Adjusted PM10 Emissions Rates for PFE Facility by Hour of the Day for Different Wind Arc Scenarios, g/sec

	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
Base	2.5	3.7	4.1	3.0	3.4	5.2	5.7	19.2	24.0	16.6	10.7	14.0	14.1	13.0	15.4	9.2	21.2	11.8	1.9	6.4	2.5	1.8	2.4	3.6
Nrrw	2.4	2.7	3.1	2.5	2.9	4.7	3.6	18.3	18.8	18.7	9.4	14.4	15.0	16.1	11.4	5.7	13.0	12.7	1.5	7.1	2.4	1.4	2.0	2.8
West	2.9	4.4	4.3	4.2	3.9	5.7	11.7	39.3	28.5	13.9	20.2	10.4	23.1	12.6	14.0	6.3	19.2	16.8	3.5	11.8	2.9	1.7	2.3	3.5
East	1.9	3.1	3.5	2.2	3.6	4.5	3.6	14.9	22.6	16.2	4.6	14.4	9.9	17.1	10.3	8.2	N/A	2.0	3.0	1.1	3.5	2.3	2.5	3.3
East+	1.6	3.3	2.8	2.4	3.2	4.2	4.7	12.7	19.2	15.7	6.7	12.1	9.7	12.3	17.9	8.0	4.9	0.4	1.9	2.9	3.4	1.7	2.0	2.9

Figure 3-3
Plots of Adjusted PFE Facility PM_{10} Emissions Rates in 2008 by Hour of the Day and by Diurnal Profile Method



Estimated Hourly PFE Emission Rates, g/sec
Best Wind Direction Arc Scenario and ACFA Activity-Based Estimates

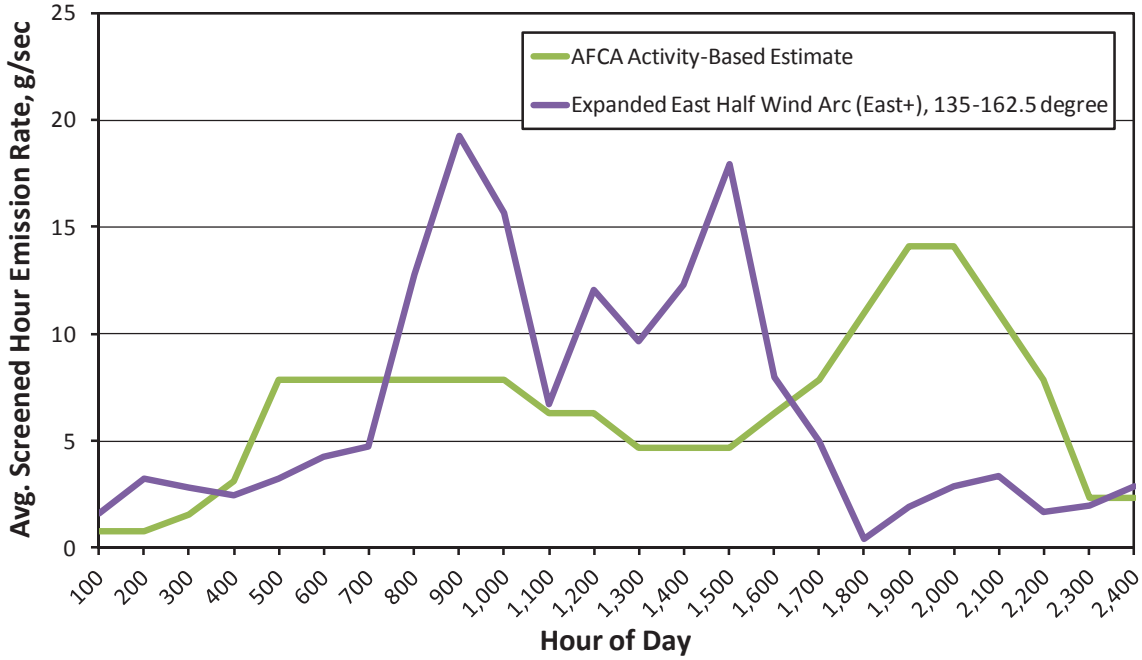


Table 3-17 2008 PFE PM_{10} Emissions Rates by Wind Arc Scenario				
Scenario	PM_{10} Emission Rate or Factor			Fraction of Bonifacio E.F.
	g/sec	lb/day	lb/head-day	
Base	9.0	1,708.8	0.090	144%
Narrow	8.0	1,530.7	0.081	129%
West	11.1	2,120.1	0.112	179%
East	6.9	1,313.2	0.069	111%
East+	6.5	1,243.5	0.066	105%

All of the wind direction arc scenarios evaluated produced somewhat anomalous median values of monitored and modeled data in the hour-of-the-day bins from 1500 through 1900 hours because of the paucity of days (e.g., n = 3 to 6) in 2008 during which the selected meteorological conditions were satisfied during these hours. As a result, concern was expressed by representatives of the Arizona Cattle Feeders Association (ACFA) with respect to the diurnal profile of hourly feedlot emission rates produced by this analysis.

In response to a request for an alternative profile recommended by the industry, the Association provided a diurnal profile that is shown in Table 3-18.[30] The ACFA profile is based on Pinal Feeding Company records of operations in 2008, visual observations by facility staff during 2008, and the technical judgment of ACFA staff. For comparison purposes, the profile produced by the East+ scenario is also shown in Table 3-18.

Because the diurnal profiles that were calculated from the Cowtown monitoring data analysis suffered from statistical uncertainty due to the small numbers of data points in the 1500 through 1900 hour bins, the activity-based diurnal profiles of feedlot PM_{10} emissions recommended by ACFA were used in the attainment demonstration modeling at the Cowtown monitor and at other monitors where feedlots were found in affiliated modeling domains. A comparison of the hourly emission rates for the PFE facility using the ACFA and the reverse dispersion modeling diurnal profiles appears in the lower half of Figure 3-3.

[30] "Estimate of Approximate Hourly Percentage Activity in Pinal County Feed Yards, Late October", Bas Aja, Arizona Cattle Feeders Association, August 27, 2013, as amended by Bas Aja in telecom on October 23, 2013.

Table 3-18 Diurnal Profiles of Feedlot PM_{10} Emissions (Percent of Daily Emissions)		
Hour	Initial ACFA Activity-Based Assessment	Cowtown Monitoring Data Assessment
0100	1.0%	1.0%
0200	1.0%	2.1%
0300	1.0%	1.8%
0400	2.0%	1.6%
0500	5.0%	2.1%
0600	5.0%	2.7%
0700	5.0%	3.0%
0800	5.0%	8.1%
0900	5.0%	12.3%
1000	5.0%	10.0%
1100	4.0%	4.3%
1200	4.0%	7.7%
1300	3.0%	6.2%
1400	3.0%	7.8%
1500	3.0%	11.4%
1600	4.0%	5.1%
1700	5.0%	3.2%
1800	7.0%	0.3%
1900	8.0%	1.2%
2000	8.0%	1.9%
2100	7.0%	2.1%
2200	5.0%	1.1%
2300	2.0%	1.3%
2400	2.0%	1.8%

The hourly emission rates for feedlots were also disaggregated into hourly rates for each of four contributory emission sources or activities deemed in the literature to constitute the vast majority of facility emissions. These contributory sources or activities are identified by the Governor's Agricultural Best Management Practices Committee (BMP Committee) as follows:

a. Unpaved access connections;
b. Unpaved roads or feed lanes;
c. Animal waste handling and transportation; and
d. Arenas, corrals, and pens.[31]

[31] Agricultural Best Management Practices for Livestock Operations, Governor's Agricultural Best Management Practices Committee, July 27, 2010.

This report also cites the San Joaquin Valley Air Pollution Control District (San Joaquin Valley) as the source of emission factors for these individual sources. The San Joaquin Valley report that is identified in the BMP Committee citation is the 2006 technical support document evaluating control measures for all agricultural and feedlot operations regulated by the Valley's Rule 4550 (Conservation Management Practices).[32] This report identified the following four contributory emission sources or activities:

a. Unpaved areas;
b. Unpaved roads;
c. Overall management/feeding; and
d. Pens/manure handling.

The San Joaquin Valley also estimated the fractional contributions of these sources to total facility emissions as follows: unpaved areas – 5%, unpaved roads – 15%, overall management/feeding – 5%, and pens/manure handling – 75%. These fractions were estimated from visual observations of feedlots operations and engineering judgment.

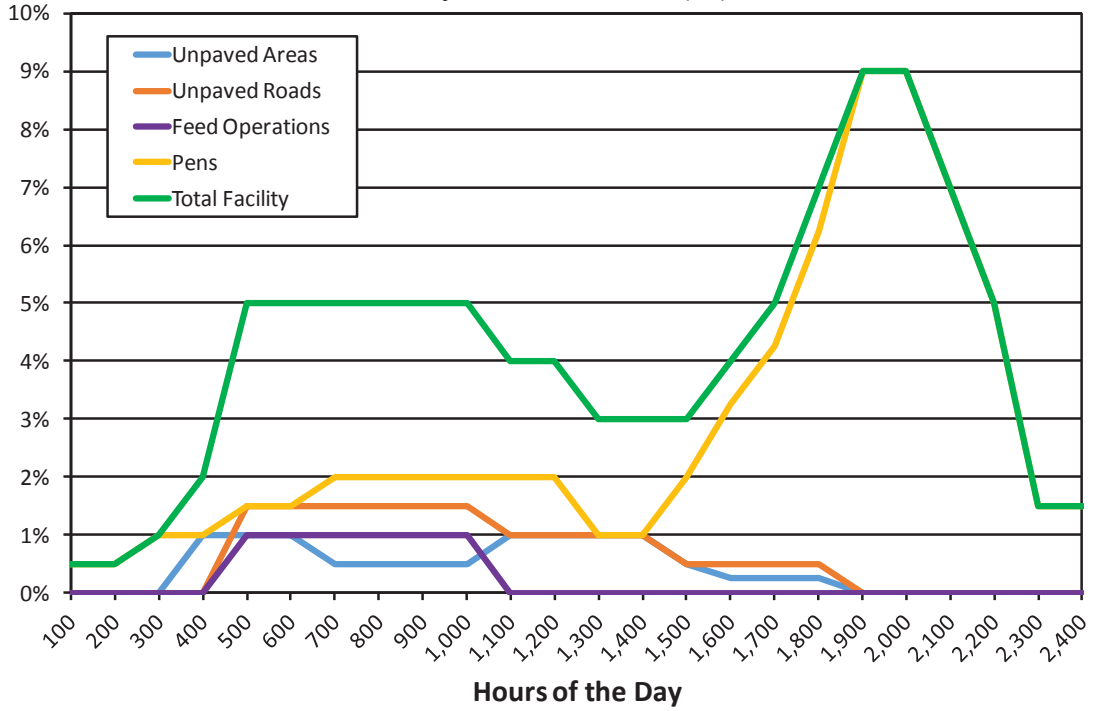
Information from the BMP Committee's report, the San Joaquin Valley report, and discussions with ACFA representatives was used to estimate hourly emission profiles for the four contributory sources. The emission profiles were initially designed to sum to the 24-hour total emission contribution fractions estimated in the San Joaquin Valley report, but the resulting hourly emission totals for the four sources—using the San Joaquin Valley source groups and underlying assumptions of activity—did not reconcile with the hourly activity-based emission profile for a whole facility as initially estimated by ACFA representatives. In a subsequent analysis, emission profiles for the four contributory sources were adjusted to reconcile with the ACFA whole facility profile without regard to the fractional contributions estimated by San Joaquin Valley. The results of this analysis were shared with an ACFA representative and, with minor adjustments, were accepted on behalf of ACFA as approximating the hourly profiles of the sources or activities contributing to total feedlot PM_{10} emissions on an average day in October, the month represented by the Cowtown stagnation design day. The adjustments suggested by ACFA reduced activity estimates in hours 0100, 0200, 2300, and 2400, and increased activity estimates in hours 1900 and 2000. A tabulation of the hourly fractional contributions of these sources to daily total feedlot emissions, together with the hourly profile of total feedlot emissions, recommended by ACFA is presented in Table 3-19. Note in the "Total" row at the bottom of Table 3-19 that the individual sources contribute the following fractions of 24-hour total facility emissions: unpaved areas – 10.25%, unpaved roads – 15.00%, feed operations – 6.00%, and pens – 68.75%. A plot of the diurnal profiles of the contributory source emission factors (in g/sec-head) and of the total facility emission factors is shown in Figure 3-4.

[32] Conservation Management Practices Program Report for 2005, San Joaquin Valley Air Pollution Control District, January 19, 2006.

Table 3-19
Diurnal Profiles of Contributory Sources and Total Feedlot PM_{10} Emissions
(Percent of Total Daily Facility Emissions)

Hour	Final ACFA Activity-Based Estimate				
	Unpaved Areas	Unpaved Roads	Feed Operations	Pens	Total
0100	0.00%	0.00%	0.00%	0.50%	0.50%
0200	0.00%	0.00%	0.00%	0.50%	0.50%
0300	0.00%	0.00%	0.00%	1.00%	1.00%
0400	1.00%	0.00%	0.00%	1.00%	2.00%
0500	1.00%	1.50%	1.00%	1.50%	5.00%
0600	1.00%	1.50%	1.00%	1.50%	5.00%
0700	0.50%	1.50%	1.00%	2.00%	5.00%
0800	0.50%	1.50%	1.00%	2.00%	5.00%
0900	0.50%	1.50%	1.00%	2.00%	5.00%
1000	0.50%	1.50%	1.00%	2.00%	5.00%
1100	1.00%	1.00%	0.00%	2.00%	4.00%
1200	1.00%	1.00%	0.00%	2.00%	4.00%
1300	1.00%	1.00%	0.00%	1.00%	3.00%
1400	1.00%	1.00%	0.00%	1.00%	3.00%
1500	0.50%	0.50%	0.00%	2.00%	3.00%
1600	0.25%	0.50%	0.00%	3.25%	4.00%
1700	0.25%	0.50%	0.00%	4.25%	5.00%
1800	0.25%	0.50%	0.00%	6.25%	7.00%
1900	0.00%	0.00%	0.00%	9.00%	9.00%
2000	0.00%	0.00%	0.00%	9.00%	9.00%
2100	0.00%	0.00%	0.00%	7.00%	7.00%
2200	0.00%	0.00%	0.00%	5.00%	5.00%
2300	0.00%	0.00%	0.00%	1.50%	1.50%
2400	0.00%	0.00%	0.00%	1.50%	1.50%
Total	10.25%	15.00%	6.00%	68.75%	100.00%

Figure 3-4
Feedlot Total and Contributory Source Hourly Fractions of Daily Emission Total (%)



3.1.1.3 On-Road Mobile Source Emissions Modeling for Paved Roads

On-road mobile source emissions were modeled for five episode days in the year 2008 using the latest on-road emissions estimation model approved by EPA, MOVES2014. Episodic emissions are created from MOVES2014 simulations in the emission rates mode using county-wide inputs configured with local data where available. The four modeling domains are located within Area C where I/M programs are not required. In September 2014, MAG transportation division generated a reference year 2015 detailed traffic assignment without centroid for four non-centroid areas, each representing the traffic area zones (TAZ) surrounding the four monitoring sites. The detailed traffic assignment data for each area are scaled individually for the year 2008 and 2018. The scaled traffic assignment data for the four areas are used to calculate link-based mobile emissions. Centroid connector specific information was apportioned to the actual paved road network so ADEQ could accurately spatially distribute emissions within each modeling domain during subsequent rollback and AERMOD e missions modeling for monitor impacts. MOVES derived PM_{10} emission rates for exhaust, tire, and brake wear were then integrated into a lookup table in a spreadsheet containing link-specific Travel Demand Model (TM) outputs from the Maricopa Association of Governments TransCAD model outputs for Pinal County in 2015. The 2015 TM outputs were backcast to 2008. For each non-centroid area, the first backcast ratio was calculated between the total VMTs in the 2012 MAG traffic assignment (with centroids) and the 2015 MAG traffic assignment (with centroids). The second backcast ratio was MAG's estimated human population between the years 2008 and 2012. Note that an average population ratio was used for the Cowtown area, because

human population was zero in 2008 in that area. The multiplication of the two ratios became the total back-casted ratio between 2008 and 2015 for the same non-centroid area. The four ratios were applied individually to each modeling domain traffic assignment. Emissions due to fugitive dust and bow wake were also calculated for these links based on formulas used in the Maricopa Association of Government's 2007 and 2012 Five Percent Plans.[33,34] In addition to the exhaust, brake, and tire emissions, the paved-road vehicle emissions were distributed spatially to specific links within the different dispersion modeling domains. Configuration of the MOVES model for this work required formatting of the data to a MOVES compatible format and extrapolation of the available data sources. These operations are detailed in the following sections.

MOVES Configuration – Described below are the inputs used in configuring the MOVES model for the creation of episode-specific emission rates tables.

Average Speed Distribution – MOVES requires speed distribution information organized by vehicle types, road types, and hours. Speed must be translated into one of 16 speed bins in the process of creating this input field. Table 3-20[35] shows the relationship between the 16 speed bins and the average speed and speed ranges.

Using the 2008 traffic assignment, speed distributions by vehicle types, road types, and hours for weekdays were estimated for the union of the four areas. For weekend days, nighttime's speed distribution, which is a 12-hour span, is applied for another 12-hour span. Speed distributions are weighted on a vehicle hours traveled (VHT) basis. VHT is calculated using the vehicle flow and time on a given link. Speed fractions can then be found through a weighted average of speed by VHT for each road type.

The MOVES model contains default speed distributions that are representative of average national trends, but may fail to capture local conditions. The TM output speed distributions for the restricted (freeway) and unrestricted (arterial) rural roads appeared to show slightly slower maximum speeds than the MOVES defaults during peak hours. Because the TM speed distribution outputs are link specific, they were ultimately favored over the MOVES defaults, which do not capture link-level activity.

VMT Calculations – The 2008 VMT inputs were backcast from 2015 values by a mixture of population scaling and modeled traffic assignment data, as described previously. The next step was the mapping of vehicle types between the TransCAD model and HPMS vehicle types. Table 3-21 shows an overview of the broad categories that exist in HPMS and TransCAD to describe vehicle classes.

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[33] "Cost-Effectiveness of Selected PM_{10} Control Measures," prepared for Maricopa Association of Governments by Sierra Research, June 2006 p. 26.

[34] "MAG 2012 Five Percent Plan For PM-10 for the Maricopa County Nonattainment Area," Maricopa Association of Governments, March 2012, Appendix A, section 5.3, p. 117-119.

[35] This table was reproduced from the Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity, Transportation and Regional Programs Division Office of Transportation and Air Quality U.S. Environmental Protection Agency, EPA-420-B-09-042 December 2009, page 26, Table 3.6.

Table 3-20 MOVES Speed Bins		
Speed Bin ID	Average Bin Speed	Speed Bin Range
1	2.5	speed < 2.5 mph
2	5	2.5 mph ≤ speed < 7.5 mph
3	10	7.5 mph ≤ speed < 12.5 mph
4	15	12.5 mph ≤ speed < 17.5 mph
5	20	17.5 mph ≤ speed < 22.5 mph
6	25	22.5 mph ≤ speed < 27.5 mph
7	30	27.5 mph ≤ speed < 32.5 mph
8	35	32.5 mph ≤ speed < 37.5 mph
9	40	37.5 mph ≤ speed < 42.5 mph
10	45	42.5 mph ≤ speed < 47.5 mph
11	50	47.5 mph ≤ speed < 52.5 mph
12	55	52.5 mph ≤ speed < 57.5 mph
13	60	57.5 mph ≤ speed < 62.5 mph
14	65	62.5 mph ≤ speed < 67.5 mph
15	70	67.5 mph ≤ speed < 72.5 mph
16	75+	72.5 ≤ speed

Conversion factors were developed by MAG for all HPMS vehicle types over all road types for the years 2011, 2015, 2018 and 2020. Tables 3-22, 3-23, and 3-24 show the conversion factors used for HPMS 10, 20, 30, 40 and 60. HPMS 50 and the MED vehicle class are equivalent between the two vehicle categorization systems, so no conversion factor was required.

Total VMT was summed from the TransCAD outputs by the TransCAD vehicle types and road types before being converted over to the HPMS vehicle types using the conversion factors in Tables 3-21 to 3-24. Table 3-25 summarizes the vehicle activity within the PM_{10} nonattainment area as a whole. HPMS vehicle types were converted from the MAG vehicle types shown in Table 3-25.

Table 3-21 Overview of HPMS and TransCAD Mapping			
HPMS Vehicle Type	FHWA Description*	MAG TransCAD Vehicle Class	MAG TransCAD Vehicle Class Description
10	Motorcycles	LOV + HOV + LGT	Single occupancy passenger cars (and trucks) including motorcycles
20	Passenger Cars		2+ occupancy passenger cars (and trucks)
30	Other Two-Axle, Four-Tire Single-Unit Vehicles		Light duty commercial – vehicle weight 0~8,000 lbs
50	Two-Axle, Six-Tire Single-Unit Trucks	MED	Medium duty commercial – FHWA vehicle classes 5 through 7
	Three-Axle, Six-Tire Single-Unit Trucks		
	Four or More Axle Single-Unit Trucks		
40	Buses	HVY	Heavy duty commercial – FHWA vehicle classes 4 and 8 through 13
60	Four or Fewer Axle Single-Trailer Trucks		
	Five-Axle Single-Trailer Trucks		
	Six or More Axle Single-Trailer Trucks		
	Five or Fewer Axle Multi-Trailer Trucks		
	Six-Axle Multi-Trailer Trucks		
	Seven or More Axle Multi-Trailer Trucks		

Source: Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity, Transportation and Regional Programs Division Office of Transportation and Air Quality U.S. Environmental Protection Agency, EPA-420-B-09-042 December 2009, page 26, Table 3.6.

Table 3-22 HPMS to TransCAD Motorcycle Conversion Factors						
RoadTypeID	HPMS Vehicle Type	Split Factor to HOV+LOV				
		2008	2011	2015	2018	2020
2	10	0.83%	0.79%	0.77%	0.74%	0.72%
3	10	0.74%	0.69%	0.66%	0.64%	0.63%
4	10	0.71%	0.67%	0.65%	0.63%	0.61%
5	10	0.60%	0.56%	0.54%	0.52%	0.51%

Table 3-23 HPMS to TransCAD Light-Duty Conversion Factors						
RoadTypeID	HPMS Vehicle Type	Split Factor to (HOV+LOV-MC)+LGT				
		2008	2011	2015	2018	2020
2	20	57.2%	58.4%	59.1%	61.1%	62.4%
	30	42.8%	41.6%	40.9%	38.9%	37.6%
3	20	56.2%	57.4%	58.1%	60.1%	61.5%
	30	43.8%	42.6%	41.9%	39.9%	38.5%
4	20	58.3%	59.5%	60.2%	62.2%	63.5%
	30	41.7%	40.5%	39.8%	37.8%	36.5%
5	20	58.2%	59.4%	60.1%	62.1%	63.4%
	30	41.8%	40.6%	39.9%	37.9%	36.6%

Table 3-24 HPMS to TransCAD Heavy-Duty Conversion Factors						
RoadTypeID	HPMS Vehicle Type	Split Factor to HVY				
		2008	2011	2015	2018	2020
2	40	1.9%	2.0%	2.1%	2.2%	2.3%
	60	98.1%	98.0%	97.9%	97.8%	97.8%
3	40	7.5%	7.8%	8.3%	8.6%	8.8%
	60	92.5%	92.2%	91.7%	91.4%	91.2%
4	40	3.2%	3.4%	3.6%	3.7%	3.8%
	60	96.8%	96.7%	96.4%	96.3%	96.2%
5	40	6.7%	7.0%	7.5%	7.7%	7.9%
	60	93.3%	93.0%	92.5%	92.3%	92.1%

Table 3-25 2008 VMT Input Calculations for MOVES for Total Annual VMT Pinal County PM_{10} Nonattainment Area	
HPMSVtypeID	2008
10	14,234,804
25	1,242,974,475
40	7,784,680
50	68,670,525
60	143,815,922
Total	1,477,480,406

The totals in Table 3-25 reflect only the VMT in the PM_{10} nonattainment area and not the entire county. Since emission rates are calculated by MOVES for a single unit of activity, the VMT totals do not impact the rates output by MOVES. The average daily VMT total from the TransCAD model in the PM_{10} nonattainment area for 2008 was calculated to be 4,036,832 miles.

Hourly Fractions – Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data recorded by continuous traffic counters on freeways (ADOT Freeway Management System) and arterials (Phoenix Automatic Traffic Recorders) during the year 2007. Table 3-26 gives the annual weekend and weekday hourly fractions for freeways and arterials inside Area

Table 3-26
2008 Annual Inside Area A Hourly VMT Fractions by Road Type and Day

HourID	Freeway VMT Fractions		Arterial VMT Fractions	
	Weekend	Weekday	Weekend	Weekday
1	0.0213	0.0093	0.0213	0.0061
2	0.0151	0.0066	0.0151	0.0040
3	0.0135	0.0063	0.0135	0.0034
4	0.0103	0.0086	0.0103	0.0040
5	0.0124	0.0236	0.0124	0.0096
6	0.0199	0.0478	0.0199	0.0257
7	0.0281	0.0592	0.0281	0.0489
8	0.0349	0.0605	0.0349	0.0700
9	0.0414	0.0582	0.0414	0.0633
10	0.0493	0.0550	0.0493	0.0503
11	0.0558	0.0516	0.0558	0.0498
12	0.0598	0.0533	0.0598	0.0550
13	0.0640	0.0555	0.0640	0.0584
14	0.0646	0.0593	0.0646	0.0580
15	0.0637	0.0644	0.0637	0.0640
16	0.0634	0.0636	0.0634	0.0730
17	0.0638	0.0605	0.0638	0.0785
18	0.0627	0.0581	0.0627	0.0812
19	0.0592	0.0527	0.0592	0.0639
20	0.0508	0.0406	0.0508	0.0430
21	0.0445	0.0334	0.0445	0.0338
22	0.0410	0.0308	0.0410	0.0275
23	0.0354	0.0244	0.0354	0.0179
24	0.0254	0.0164	0.0254	0.0107

A and is presented as a sample dataset. Design day and annual, outside Area A, specific values were developed separately. The final MOVES inputs apply the freeway fractions to the rural and urban restricted access road types (2 & 4) with the arterial fractions applied to the rural and urban unrestricted access road types (3 & 5). Weekend fractions are applied to the MOVES dayID 2 (weekend day tag) while the weekday fractions are applied to MOVES dayID 5 (weekday day tag). The hourly VMT fractions were held static across source types.

Daily Fractions – Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data recorded by continuous traffic counters on freeways (ADOT Freeway Management System) and arterials (Phoenix Automatic Traffic Recorders) during the year 2007. Daily fractions were averaged separately over the weekends and weekdays. MOVES allows for month specific daily fractions and road type specific daily fractions. Road types were assigned as described in the hourly fractions section. Month specific daily data was available and used to assign fractions to specific months. Table 3-27 summarizes a sample for one month of the daily VMT fractions over all road types and day types within MOVES.

Monthly Fractions – Monthly VMT fractions were adapted from the same source material as the hourly and daily fractions. MOVES allows for monthly fractions to vary by vehicle source type. Source type weighting was accomplished using VMT distributions from the road type distribution calculations. Arterial and freeway monthly distributions could then be allocated by the VMT distributions of vehicle source types on those roads. MOVES also expects data to be flagged as either occurring in a leap year or not—for 2008, the data were flagged as being in a leap year. Table 3-28 shows the monthly VMT fraction inputs calculated for 2008 for source type 11.

Table 3-27
One-Month Sample Daily VMT Fractions for 2008
by Road Type and Month

monthID	roadTypeID	dayID	dayVMTFraction
1	1	2	0.227
1	1	5	0.773
1	2	2	0.234
1	2	5	0.766
1	3	2	0.220
1	3	5	0.780
1	4	2	0.234
1	4	5	0.766
1	5	2	0.220
1	5	5	0.780

Table 3-28 Sample Monthly VMT Fractions for 2008 by Source Type Showing Only Source Type 11			
sourceTypeID	isLeapYear	monthID	Calculated Month VMTFraction
11	Y	1	0.083
11	Y	2	0.086
11	Y	3	0.086
11	Y	4	0.086
11	Y	5	0.084
11	Y	6	0.082
11	Y	7	0.079
11	Y	8	0.081
11	Y	9	0.082
11	Y	10	0.083
11	Y	11	0.084
11	Y	12	0.083

Road Type Distribution – Road types were determined based on the TransCAD area types and facility types shown in Tables 3-29 and 3-30. The equivalent MOVES roadTypeID for a set of facility and area pairings is shown in Table 3-31. Each RoadTypeID can be mapped from several different permutations of area and facility type.

TransCAD model VMT was translated into road type VMT fractions for each vehicle source type. Using the converted roadTypeIDs described in Tables 3-29 through 3-31, the VMT for each of the TransCAD vehicle source types was summarized for the 2015 and 2020 years. TransCAD vehicle source type VMT was then mapped to HPMS vehicle source types and finally MOVES vehicle sourceTypes.

Table 3-32 shows the final distributions of road types on a VMT basis for 2008.

Table 3-29 Road Area Types for TransCAD Model Outputs	
Area Type	Description
1	Central Business
2	Urban
3	Urban Fringe
4	Suburban
5	Rural

Table 3-30 Road Facility Types for TransCAD Model Outputs	
Facility Type	Description
0	Freeway HOV lane
1	Freeway
2	Expressway
3	Collector
4	6 Legged Arterial
5	Centroid Connector
6	Major Arterial
7	Unmetered Ramp
8	Freeway Metered Ramp
9	CD Road
10	Parkway
11	Unpaved Road

Table 3-31 RoadTypeID Mapped to TransCAD Area and Facility Types			
Road Description (MOVES)	Road Type ID (MOVES)	Area Types (TransCAD)	Facility Types (TransCAD)
Rural Restricted Access	2	5	0,1,7,8,9
Rural Unrestricted Access	3	5	2,3,4,5,6,10,11
Urban Restricted Access	4	1,2,3,4	0,1,7,8,9
Urban Unrestricted Access	5	1,2,3,4	2,3,4,5,6,10,11

Table 3-32 Road Type VMT Distribution Interpolation		
sourceTypeID	roadTypeID	2008
11	1	0.000
11	2	0.000
11	3	0.846
11	4	0.000
11	5	0.154
21	1	0.000
21	2	0.000
21	3	0.806
21	4	0.000
21	5	0.194
31	1	0.000
31	2	0.000
31	3	0.837
31	4	0.000
31	5	0.163
32	1	0.000
32	2	0.000
32	3	0.837
32	4	0.000
32	5	0.163
41	1	0.000
41	2	0.000
41	3	0.835
41	4	0.000
41	5	0.165
42	1	0.000
42	2	0.000
42	3	0.835
42	4	0.000
42	5	0.165
43	1	0.000
43	2	0.000
43	3	0.835
43	4	0.000
43	5	0.165

Table 3-32 Road Type VMT Distribution Interpolation		
sourceTypeID	roadTypeID	2008
51	1	0.000
51	2	0.000
51	3	0.857
51	4	0.000
51	5	0.143
52	1	0.000
52	2	0.000
52	3	0.857
52	4	0.000
52	5	0.143
53	1	0.000
53	2	0.000
53	3	0.857
53	4	0.000
53	5	0.143
54	1	0.000
54	2	0.000
54	3	0.857
54	4	0.000
54	5	0.143
61	1	0.000
61	2	0.000
61	3	0.884
61	4	0.000
61	5	0.116
62	1	0.000
62	2	0.000
62	3	0.884
62	4	0.000
62	5	0.116

Source Type Population – MAG reviewed and compiled vehicle registration information for the nonattainment area broken down by Source Type ID. This information was used for the MOVES importer inputs. As shown in Table 3-33, the total population count for 2008 is 165,344. Source type population was based on ADOT's 2008 vehicle registration information for Pinal County broken down by source type, source type populations for the union of the four non-centroid areas were scaled using ratios derived by population data covered by each non-centroid area and Pinal County in 2008. The 2008 population data for Pinal County and the four non-centroid area were provided by the MAG GIS group. Note that no single unit or combination long-haul trucks were included, because they are assumed to operate on interstate highways.

Source Type Age Distribution – Vehicle age distributions were supplied by ADOT from vehicle registration data for the year 2012 in Pinal County, broken out by specific vehicle classes.[36] These vehicle classes were mapped into MOVES source type IDs and the age distributions were calculated as fractions of registered vehicles for a given year divided by the sum total of vehicles in that class over all years. The years were translated into an equivalent ageID as dictated by the MOVES formatting requirements. The ageID is defined as the difference between the registration year and the year being modeled (2008 – registration year). The MOVES model requires age fractions for the age IDs between 0 and 30. It is assumed that the same source type age distribution will be maintained between the years 2008 and 2012.

Table 3-33
Vehicle Population for Pinal County 2008

yearID	sourceTypeID	Source Description	sourceTypePopulation
2008	11	Motorcycle	6,060
2008	21	Passenger Car	112,615
2008	31	Passenger Truck	32,891
2008	32	Light Commercial Truck	11,740
2008	41	Intercity Bus	13
2008	42	Transit Bus	38
2008	43	School Bus	602
2008	51	Refuse Truck	20
2008	52	Single Unit Short-haul Truck	700
2008	53	Single Unit Long-haul Truck	53
2008	54	Motor Home	59
2008	61	Combination Short-haul Truck	316
2008	62	Combination Long-haul Truck	238
TOTAL			165,344

[36] Original spreadsheet "MOBILE6 REG DIST CALC 2008 for Pinal.xlsx" was downloaded on March 6, 2013, from ftp://ftp.azdot.gov/MPDAirQuality/Sierra Research/ADOT MOVES Calculation for Pinal/. An updated spreadsheet "August_2012.xls" was provided in an e-mail correspondence from Beverly Chenausky (*bchenausky@azdot.gov*) on May 28, 2013.

Meteorology – The meteorological conditions were imported as hourly temperature and relative humidity data from Casa Grande for each of the model episodes: January 1, April 27, October 27, October 29, and November 20.[37] The October 29th meteorology data were used in the case of the October 30th model day.

Fuel Supply – MOVES2014 default values for 2008 gasoline and diesel fuel formulations were updated with the 2008 fuel inspection data provided by the Arizona Department of Weights and Measures..

Fuel Formulation – MOVES2014 default values for 2008 gasoline and diesel fuel formulations were updated with the 2008 fuel inspection data provided by the Arizona Department of Weights and Measures.

I/M Programs – No I/M programs were applied for the union of the four non-centroid areas.

AVFT – Based on MOVES2014 default values, transit bus data were updated with the local year 2010 information provided by the Valley Metro.

Ramp Fractions – No ramp fractions calculations were applied, because there was no ramp road types within the modeling domains.

Emissions Calculations – The calculation of emissions due to exhaust, brake, tire, fugitive dust, and bow wake from paved road vehicle activity is explained below.

Onroad Exhaust, Brake, and Tire – Following the execution of the MOVES model for an episode day, the emission rate tables were extracted from the output database. The rate per distance (RPD) and rate per vehicle (RPV) tables were both exported from MySQL into Excel spreadsheets. The RPD table contains information on the vehicle emission rates in grams per mile for different pollutants by process, source type, speed, road type, and hour. These variables were converted via a pivot table to a lookup table for use with the travel model outputs. Travel model outputs contain VMT organized by link, hour-groups, speed, vehicle-type groups and facility type. Emission rates were selected from the lookup table based on a link's hour, speed and vehicle-type groups and then multiplied by the VMT of the vehicle-type group to give the emissions on that link for each vehicle-type group. The emissions were then summed over the vehicle-type groups to give the total emissions on a link due to exhaust, brake and tire.

The travel model uses four categories of vehicles—LOV, HOV, LGT, MED, and HVY—as described in Table 3-21. The TM activity and the MOVES lookup data are translated to a common reference point, the HPMS vehicle categories in Table 3-34.

The emission rates for each HPMS vehicle category were then organized into a look-up table by hour, speed bin, and road type. The emission rate for each vehicle group is then chosen based on the hour group and speed bin, and multiplied by the VMT for that vehicle group.

[37] These data were downloaded from *ftp://ftp.ncdc.noaa.gov/pub/data/noaa/2008/* on July 3, 2013.

The total exhaust, brake, and tire PM_{10} is then summed across the six vehicle groups according to the equation shown below. Note that ER in the equation below stands for the emission rate of a given vehicle group. The subscripts on VMT and ER represents the HPMS vehicle type.

$$PM_{10} = VMT_{10}*ER_{10} + VMT_{20}*ER_{20} + VMT_{30}*ER_{30} + VMT_{40}*ER_{40} + VMT_{50}*ER_{50} + VMT_{60}*ER_{60}$$

Rates were calculated using inputs for the entire county on the given episode days. The rates output table can be applied to any spatial domain desired on an hourly basis given that speed bin and vehicle type VMT data are available.

Fugitive Dust – Paved-road vehicle emissions of fugitive dust were calculated using VMT and emission rates that vary by the silt loading of a given road. These rates are derived from an AP-42 equation shown below and described in detail in MAG's 2012 Five Percent Plan.[38]

Table 3-34
MS MOVES Source Type Mapping Overview

HPMS Vehicle Type	sourceTypeID	sourceTypeName
10	11	Motorcycle
20	21	Passenger Car
30	31	Passenger Truck
	32	Light Commercial Truck
40	41	Intercity Bus
	42	Transit Bus
	43	School Bus
50	51	Refuse Truck
	52	Single Unit Short-haul Truck
	53	Single Unit Long-haul Truck
	54	Motor Home
60	61	Combination Short-haul Truck
	62	Combination Long-haul Truck

[38] "MAG 2012 Five Percent Plan For PM-10 for the Maricopa County Nonattainment Area," Maricopa Association of Governments, March 2012 Appendix A, section 5.3, p. 117-119.

$$E = k \times sL^{0.91} \times W^{1.02} \times (1 - \frac{P}{4N})$$

where:

E = emission factor on an annual average basis

k = particle size allocation factor (1.0 for PM_{10} particles and 0.25 for $PM_{2.5}$)

sL= silt loading for road surface type (freeways are 0.02 g/m^2, high-traffic arterials are 0.067 g/m^2, low-traffic arterials are 0.23 g/m^2)

W = vehicle weight averaged over specific road ways (freeway vehicle averages are 3.53 tons and arterial vehicle averages are 2.65 tons)

P = number of days in a year with precipitation over 0.254 mm (0.01 in) and determined to be 31 days for 2008

N = the number of days in the year 2008 (366 days).

The values assigned to the variables described above were derived from MAG's Five Percent Plan, where more appropriate values were not incorporated, in order to provide consistent and defensible assumptions for the Pinal County PM_{10} SIP modeling work.

Table 3-35 shows emission rates for a given road type ID and volume.

Values from the travel model were used to determine whether a specific link falls into the low or high traffic count category for arterials. The VMT values were summed over the six HPMS vehicle categories: 10, 20, 30, 40, 50, and 60. Total link VMT for each hour group was multiplied by the emission rate for that link based on the road type and daily traffic count.

Table 3-35
PM_{10} Emission Rates for Paved Road Fugitive Dust

Road Type ID	Emission Rate	Road Description
2,4	0.1 (g/mi)	Freeways
3,5 (Low Traffic)	0.69 (g/mi)	Low Traffic Arterials (weekday counts < 10,000)
3,5 (High Traffic)	0.22 (g/mi)	High Traffic Arterials (weekday counts ≥ 10,000)

Bow Wake Emissions – PM_{10} generated from the bow wake of large trucks traveling on roads with unpaved shoulders was calculated from the following emissions rate formula:[39]

$$0.03 * (SPEED/55\ MPH)^2 = PM_{10}\ (lbs/VMT)$$

The variable SPEED is the link-specific speed from the travel model. Only the VMT from the large multi and single unit trucks (HPMS 60 category) was used in this calculation. To determine whether a particular road has paved or unpaved shoulders, a map was generated by ADOT that labeled some of the major roadways in the county with one of eight shoulder categories. Per the guidance of ADOT personnel, only shoulders labeled as gravel would be considered unpaved based on their maps.[40] Some of the shoulders that remained uncategorized were assigned to paved or unpaved based on guidance from Pinal County personnel.

Summary – Total PM_{10} emissions were summed across the exhaust, brake, tire, fugitive dust, and bow wake subtotals for a given link in a given hour group. Since the dispersion model requires an input of hourly emissions for the links, the PM_{10} emissions for an hour group are distributed to individual hours based on hourly VMT fractions. Table 3-26 above shows the hour group fractions used to allocate from each hour group to an individual hour. Emissions can then be pulled only from links in one of the modeling domains to be used as inputs for the dispersion modeling.

Supplemental Data – The full runspec and importer input files for these emission rate runs were provided in additional .mrs and .xls files by MAG, and are available upon request from ADEQ. The October 29th mobile source emissions were used in the case of the October 30th model episode as both days were weekdays and traffic patterns were not assumed to vary during weekdays.

Test Tracks – Two vehicle manufacturers operate test tracks within the PM_{10} nonattainment area and the Cowtown stagnation and high wind modeling domains: Nissan and Volkswagen. ADEQ contacted each manufacturer and obtained information on the mix of vehicles operated on the paved roads located at their facilities, average speeds, annual VMT, etc. Considering the high-speeds—up to 80 mph and 100 mph—at the facilities and daily usage of these tracks, a dust emission rate was determined based on the silt loading factor from freeways along with reduced vehicle weights matching a light-duty vehicle fleet. This revised emission rate was then used to calculate emissions from the paved roads located within these facilities.[41]

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[39] "Cost-Effectiveness of Selected PM_{10} Control Measures," prepared for Maricopa Association of Governments by Sierra Research, June 2006, p. 26.

[40] PDF images—PinalCnty.pdf , PinalCnty_CasaGrande.pdf and PinalCnty_ApacheJunction.pdf—were provided in two separate e-mail correspondences from Beverly Chenausky (bchenausky@azdot.gov) on May 6, 2013.

[41] Since the manufacturers do not produce or test heavy-duty trucks, the average weight of vehicles operated at the tracks is lower than those operated on the highways. Based on the test track activity, the silt loading of the paved test tracks was assumed to match the value determined for freeways. Calculations showed that the reduced weight of the vehicles on the test track led to a slightly lower emission rate on the test tracks than that cited in Table 2-4 for freeways.

The detailed assumptions for the calculation of the fugitive dust emissions from the two test tracks are summarized below.

- For the Nissan test tracks, the daily paved road VMT were derived by dividing the annual VMT of 2,000,000 by 366 days. The daily emissions were then distributed evenly to each hour, by dividing by 24 hours.

- For the Volkswagen test tracks, monthly VMT estimates were available from the facility. The daily VMT were derived by dividing the monthly VMT (84,091 for October, 10/30/2008 design day, and 148,678 for April, 04/27/2008 design day) by 25 working days. The daily emissions were then distributed from 7 am to 11 pm, according to the operating schedule acquired from the facility.

- Paved track silt loading used the freeway value of 0.02 g/m^2.

- Vehicle weights were set to 4,500 lbs to represent vehicles operating on the test tracks.

- Precipitation days were set to 31 days to reflect Pinal County conditions.

- The paved dust emission rate was calculated to be 0.06 g/mi with 4,500 lbs average weight and 0.02 g/m^2 silt loading.

- Emissions for paved road dust were calculated by multiplying the paved test track emission rate by the paved track VMT.

- Emissions were included only for the portions of the test tracks that fall within the Cowtown modeling domains.

- MOVES was configured to quantify daily average emission rates, as follows:

    - The vehicle age distribution matched Pinal 2008 DMV data; newer model year vehicles could not be extracted from the existing lookup tables.

    - Weights initially reflected the entire county-wide fleet, but rates specific to light-duty passenger cars and trucks were extracted.

    - Default Fuel Supply and Formulations were used in the MOVES configuration and the split between gasoline and Diesel vehicles was set to default values; the existing split between gas and Diesel exhaust for light-duty passenger cars and trucks was used for the test track exhaust.

    - Annual VMT input to MOVES reflected county-wide totals; however, the lookup tables output from MOVES are multiplied into the VMT levels provided for each test track.

- Speed distributions were initially configured based on TransCAD model outputs from MAG; however, lookup tables allow for selecting rates based on a specific speed or range of speeds.

- Road distributions were set based on VMT distributions from TransCAD model outputs for Pinal County; however, lookup tables allow for choosing a specific road type when calculating an exhaust rate.

- Meteorology was set to annual average conditions as measured at Casa Grande.

- The emission rate is based on a pollutant-specific lookup table that varies by speed and vehicle type and time of day.

  - Vehicle source types were assumed to be light-duty passenger cars and trucks.

  - The vehicle age distribution was set to existing county-wide levels in order to use existing MOVES lookup tables.

  - The mix of gasoline and Diesel vehicles was modeled based on default splits.

  - Average vehicle weights were assumed to be similar to MOVES light-duty vehicles.

  - Rates assumed a county-wide mix of vehicle ages.

  - Rates were averaged over 5 to 100 mph on the paved track.

  - Using information provided by each of the manufacturers,[42] speeds were set to 45 mph for Volkswagen's unpaved track and 30 mph for Nissan's unpaved track.

  - Average daily rates were calculated ignoring hourly variability.

- Exhaust emissions were calculated by multiplying the provided VMT into a pollutant-specific and speed-specific emission rate for a population-weighted mix of light-duty cars and trucks. Start, idle, and evaporative emissions were ignored due to the lack of information on those activities and their minor contributions to the inventory total.

[42] ADEQ email correspondence dated 2/18/14 for Volkswagen and 1/13/14 for Nissan.

3.1.1.4 Unpaved Road Fugitive Dust Emissions[43]

Fugitive dust emissions from unpaved roads were calculated by applying AP-42 emission factors to unpaved road VMT estimates. The unpaved road particulate emission factors were derived from the following AP-42 equation[44] for unpaved roads:

$$E = \left[\frac{k\left(\frac{s}{12}\right)^{1}\left(\frac{S}{30}\right)^{0.5}}{\left(\frac{M}{0.5}\right)^{0.2}} - C \right]\left(1 - \frac{P}{N}\right)$$

where:

E = annual average PM emission factor (lb/mile);

k = particle size multiplier for particle size range (1.8 lb/mile for PM_{10}) (AP-42 emission factors);

s = surface material silt content, which varies depending on the different types of roads, calculated based on a field study[45] (Exhibit 2, Pinal County Field Sampling and Analysis for the Silt Characterization of Unpaved Road Dust and Agricultural Soil, conducted by ADEQ and PCAQCD, in May 2013) (values are listed in Table 3-36 below);

S = mean vehicle speed (varies depending on the type of roads, as listed in Table 3-36 below);

M = surface material moisture content, which varies depending on type of roads, calculated based on a field study (Exhibit 2, Pinal County Field Sampling and Analysis for the Silt Characterization of Unpaved Road Dust and Agricultural Soil, conducted by ADEQ and PCAQCD, in May 2013) (values listed in Table 3-36 below);

C = emission factor for 1980s vehicle fleet exhaust, brake wear, and tire wear (0.00047 lb/mile for PM_{10})[1];

P = annual number of "wet" days with at least 0.254 mm (0.01 in) of precipitation (31 days in 2008)[46]; and

N = annual number of days (366 days in 2008).

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[43] Exhaust emissions calculated for the modeling domains produced de minimus levels and were not included in the inventories.

[44] Emission Factors & AP 42, Compilation of Air Pollutant Emission Factors, Chapter 13.2.2. Unpaved Roads. *http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0202.pdf*

[45] The silt content values for AG road are calculated based on the average of both of the Ag roads samples collected in May 2013 and the Ag road samples collected in 2008, detailed in Exhibit 2.

[46] Based on precipitation data for Pinal County from the AZMET network, *http://ag.arizona.edu/azmet/az-data.htm*.

Among these variables, "s" (surface material silt content), "S" (mean vehicle speed), and "M" (surface material moisture content) vary depending the type of road surface and road activity. The collection and analysis of the data used to determine these variables is detailed in "Analysis of Unpaved Roads in the Pinal County PM_{10} Nonattainment Area" (Traffic Analysis Report), authored by Kate Edwards of the PCAQCD (see Exhibit 1). Four different types of roads (public dirt, private dirt, agriculture, and trail) are used to characterize the roads in Pinal County in the analysis. For the public dirt roads, five different classes (A, B, C, D, and E) are used to represent the different traffic volumes and vehicle speeds associated with each public dirt road. For the private dirt roads, traffic volumes and vehicle speeds are represented by two different classes (A and B). A discussion of information provided by local farmers on speeds and ADT levels is presented separately below. The values for these variables and the calculated emission factors (lbs/VMT) are summarized in Table 3-36.

Subsequent to the preparation of the Traffic Analysis Report, ADEQ held meetings with local farmers and they provided information on agricultural road activity for non-harvest and harvest operations. This information is summarized in a series of notes prepared by ADEQ staff and is presented in Exhibit 9. It shows that non-harvest operations can be characterized by single average ADT levels and speeds. However, harvest operation ADT and speeds vary by crop type. Therefore, those values vary based on the crop distribution found within each modeling domain. A summary of the values calculated for each stagnation and high wind domain is presented below in Table 3-37.

The emissions (lbs/hour) for each road are calculated by multiplying the VMT-specific emissions (E; lbs/VMT in Table 3-36) by the hourly estimated link-specific VMT in the modeling domain. The hourly VMT for each road link is calculated from the Average Daily Traffic (ADT) value, the road link length, and the related diurnal profile. The ADT values for the major roads in each modeling domain were obtained via a traffic map prepared by PCAQCD. ADTs for unpaved roadways were estimated on this map for the year 2013. Unpaved public roadways were categorized as discussed in Exhibit 1, private road ADT was estimated for each road segment separately, and all trails were assumed to have a constant ADT of 2. In order to estimate traffic growth on roadways between 2008 (Table 3-38) and 2013 (Table 3-39), ADEQ assumed traffic growth on private and public unpaved roadways mimicked HPMS data trends and backcasted ADT from 2013 to 2008 by using the adjustment ratio of 90.95%, derived from 2008 and 2013 HPMS data provided by ADOT. Agricultural roads and trails were assumed to have a constant ADT between 2008 and 2013. 2018 VMT for public and private roads was projected to 2018 assuming traffic volume increases would mirror countywide population growth over the same period. As such, VMT was projected to increase 12.14% between 2013 and 2018. The average ADTs and the total miles of each roadway type in each of the modeling domains[47] are summarized in Table 3-37 through Table 3-40.

[47] The selections of the modeling domains are detailed in Chapter 2, Modeling Domain Revisions.

Table 3-36
Measurements Used to Characterize Unpaved Road Emission Factors (E) in the Pinal County PM_{10} Nonattainment Area

Road Types	Public Dirt					Private Dirt		Agriculture[a]	Trail
	A	B	C	D	E	A	B		
S = mean speed (mph)	29	44	37	47	40	25	15	see Exhibit 9	15
s = surface material silt content (%)	7.1	7.1	7.1	7.1	7.1	14.4	14.4	14.9	14.4
M= surface material moisture content (%)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.8	0.3
E (lbs/VMT)	1.06	1.31	1.20	1.35	1.25	1.95	1.51	1.77 – 1.81	1.51

a. Due to variations in maintenance and harvest activities, speeds vary by crop type. The range of emission factors represents the bounds of the speed estimates displayed in Exhibit 9.

Table 3-37
Average Daily Traffic (ADT) and Speeds Calculated for Unpaved Agricultural Roads in the Pinal County PM_{10} Nonattainment Area

Modeling Domain	Monitoring Site	ADT	MPH
Stagnation	Cowtown	13.0	27.6
	PCH	16.1	27.4
	Stanfield	14.7	27.3
High-Wind Day, Low-Wind Hours	Cowtown	12.1	27.7
	PCH	15.6	27.7
	Stanfield	14.7	27.3
	Maricopa	12.8	27.8

Table 3-38
2008 Average Daily Traffic (ADT) Values Used for Unpaved Roads Located in the Pinal County PM_{10} Nonattainment Area

Modeling Domain	Monitoring Site	Public Dirt					Trail
		A	B	C	D	E	
Stagnation	Cowtown	23	78	88	147	N/A	2
	PCH	N/A	78	88	147	N/A	2
	Stanfield	23	78	88	147	N/A	2
High-Wind Day, Low-Wind Hours	Cowtown	23	78	88	147	N/A	2
	PCH	23	78	88	147	N/A	2
	Stanfield	23	78	88	147	N/A	2
	Maricopa	23	78	88	N/A	N/A	2

Table 3-39
2013 Average Daily Traffic (ADT) Values Used for Unpaved Roads Located in the Pinal County PM_{10} Nonattainment Area

Modeling Domain	Monitoring Site	Public Dirt					Trail
		A	B	C	D	E	
Stagnation	Cowtown	25	86	97	162	N/A	2
	PCH	N/A	86	97	162	N/A	2
	Stanfield	25	86	97	162	N/A	2
High-Wind Day, Low-Wind Hours	Cowtown	25	86	97	162	N/A	2
	PCH	25	86	97	162	N/A	2
	Stanfield	25	86	97	162	N/A	2
	Maricopa	25	86	97	N/A	N/A	2

Table 3-40 Total Length (miles) of Each Type of Unpaved Roads Used for Each Modeling Domain in the Unpaved Road Emission Calculation										
Modeling Domain	Monitoring Site	Public Dirt					Private Dirt		Agriculture	Trail
		A	B	C	D	E	A	B		
Low-Wind Modeling Domain	Cowtown	1.6	1.0	8.0	5.7	N/A	45.5	10.7	150.3	12.3
	PCH	N/A	6.9	3.2	2.3	N/A	18.5	3.2	58.6	5.6
	Stanfield	1.3	10.5	3.9	6.7	N/A	37.5	6.6	267.3	11.4
High-Wind Day, Low-Wind Hour Modeling Domain	Cowtown	0.6	2.0	9.4	6.9	N/A	42.7	13.8	137.9	11.7
	PCH	N/A	7.6	10.3	2.5	N/A	27.4	4.7	112.7	14.9
	Stanfield	1.0	10.0	3.9	5.3	N/A	35.3	6.2	255.7	10.3
	Maricopa	1.7	1.1	2.7	N/A	N/A	19.1	7.4	80.6	4.6

As noted, the diurnal variation data for different types of public and private roads were derived from the traffic data collected from 20 separate road segments in Pinal County. The values for agricultural roads and trails were limited to daylight hours and distributed uniformly within that period. Table 3-41 summarizes the diurnal variation associated with each road type in Pinal County as an hourly fraction of the daily total ADT.

Test Tracks – As noted previously, both Nissan and Volkswagen operate test tracks within the PM_{10} nonattainment area and operate vehicles on unpaved roads. Permits for these facilities indicate that emissions controls are applied to the unpaved roads at both facilities. For this reason, the silt and moisture contents for these roads are assumed to be the same as the public unpaved roads. ADEQ obtained information on travel activity and average speeds for vehicles operating on unpaved roads at each facility.

Table 3-41 Diurnal Variation for Each Unpaved Road Type in the Pinal County PM_{10} Nonattainment Area									
Hour Number	Public Dirt					Private Dirt		Agriculture	Trail
	A	B	C	D	E	A	B		
Hour 1	0.003	0.004	0.005	0.005	0.007	0.003	0.003	0.000	0.000
Hour 2	0.013	0.007	0.001	0.008	0.007	0.013	0.013	0.000	0.000
Hour 3	0.006	0.003	0.006	0.005	0.003	0.006	0.006	0.000	0.000
Hour 4	0.000	0.005	0.004	0.005	0.005	0.000	0.000	0.000	0.000
Hour 5	0.008	0.013	0.011	0.007	0.012	0.008	0.008	0.000	0.000
Hour 6	0.026	0.020	0.029	0.016	0.032	0.026	0.026	0.000	0.000
Hour 7	0.053	0.043	0.047	0.049	0.042	0.053	0.053	0.083	0.083
Hour 8	0.033	0.063	0.074	0.067	0.067	0.033	0.033	0.083	0.083
Hour 9	0.044	0.069	0.063	0.057	0.063	0.044	0.044	0.083	0.083
Hour 10	0.083	0.068	0.081	0.058	0.057	0.083	0.083	0.083	0.083
Hour 11	0.055	0.068	0.070	0.052	0.062	0.055	0.055	0.083	0.083
Hour 12	0.085	0.073	0.085	0.062	0.070	0.085	0.085	0.083	0.083
Hour 13	0.061	0.065	0.071	0.057	0.086	0.061	0.061	0.083	0.083
Hour 14	0.098	0.069	0.080	0.066	0.079	0.098	0.098	0.083	0.083
Hour 15	0.078	0.074	0.085	0.077	0.079	0.078	0.078	0.083	0.083
Hour 16	0.083	0.074	0.082	0.090	0.080	0.083	0.083	0.083	0.083
Hour 17	0.060	0.085	0.065	0.086	0.066	0.060	0.060	0.083	0.083
Hour 18	0.050	0.068	0.058	0.078	0.056	0.050	0.050	0.083	0.083
Hour 19	0.053	0.039	0.030	0.045	0.044	0.053	0.053	0.000	0.000
Hour 20	0.040	0.024	0.013	0.028	0.022	0.040	0.040	0.000	0.000
Hour 21	0.045	0.027	0.012	0.030	0.022	0.045	0.045	0.000	0.000
Hour 22	0.013	0.019	0.011	0.027	0.020	0.013	0.013	0.000	0.000
Hour 23	0.011	0.011	0.009	0.017	0.011	0.011	0.011	0.000	0.000
Hour 24	0.004	0.010	0.008	0.010	0.007	0.004	0.004	0.000	0.000

The detailed assumptions for the calculation of the unpaved dust emissions from the two test tracks are summarized below.

- For the Nissan test track, the daily unpaved VMT were derived by dividing the annual VMT of 100,000 by 366 days. The vehicle speeds were assumed to be at 30 mph at this facility. The daily emissions were then distributed evenly to each hour, by dividing by 24 hours.

- For the Volkswagen test tracks, monthly VMT estimates were available from the facility. The daily VMT were derived by dividing the monthly VMT (51,308 for October, 10/30/2008 design day, and 84,091 for April, 04/27/2008 design day) by 25 working days. The daily emissions were then distributed evenly from 7 am to 11 pm, according to the operating schedule acquired from the facility. The vehicle speeds were assumed to be at 45mph at this facility.

- Silt contents and moisture contents used the public unpaved road values of 7.1% and 0.3%, respectively.

- Precipitation days were set to 31 days to reflect Pinal County conditions.

- Emissions for unpaved dust were calculated by multiplying the test track emission rate by the unpaved track VMT.

- Emissions for unpaved dust were calculated proportionally to the whole facility, based on the portions of area of the test tracks that fall within the Cowtown modeling domains.

- Both facilities treated their unpaved roads with water controls and aggregate base (AB) controls according to contact with facility personnel.

Few estimates of the control efficiency of gravel surfacing of unpaved roads have been broadly accepted and published in regulatory fugitive PM_{10} guidelines. This is due to the highly variable nature of the control efficiency, which is dependent on the variability of gravel layer thickness, thickness uniformity, subgrade soil bearing capacity, and several other soil structural properties. Limited soil silt content data representative of uncontrolled and gravel-controlled portions of the same road, as tabulated in AP-42 Section 13.2.2, produce a calculated control efficiency of 58% using that section's Equation 1b. This value is fairly close to a commonly used control efficiency of 50% quoted in semi-quantitative assessments of unpaved road emissions. In the absence of any more accurate methodology for estimating the control efficiency of gravel application at the Nissan Motors facility, this control efficiency of 58% was used to represent gravel application and maintenance at this facility. The derivation of the control efficiency estimate for each test track is presented in Exhibit 15.

Maintenance protocols reported by the management of the test track facility to ADEQ staff indicate that fugitive PM_{10} emissions on the facility's gravel-controlled unpaved roads are also reduced through the weekly application of water.[48] The weekly application is assumed to be sufficient to wash soil silt particles almost entirely from open-pore surface aggregate on these roads, but the surface aggregate returns to its equilibrium silt content within four days of watering. At this equilibrium return rate, the control efficiency of weekly watering is 28% (= [((100% + 0%)/2)*4 days + (0%*3 days)]/7 days). This separate control efficiency, when combined with that of gravel control, produces an overall control efficiency of 70% (= 100% - (100% - 58%)*(100% - 28%)). In the absence of any other data on these Nissan Motors unpaved road PM_{10} emission controls, a control efficiency of 70% representing uniformly applied and maintained gravel surface combined with weekly watering was used to adjust the uncontrolled unpaved road travel PM_{10} emission factor at the Nissan facility.

[48] Email communication between Ryan C. Templeton, ADEQ, and Bob Dulla, Sierra Research, on February 27, 2014.

Information provided by VW indicated watering was applied to all unpaved roads within their facility once per week; however, Aggregate Base (AB) was applied to only a portion of their unpaved roads. The control efficiencies detailed above for watering and for AB were applied as appropriate to the unpaved VW roads.

3.1.1.5 Nonroad Vehicle Emissions

With the exception of the locomotive and aircraft categories, all nonroad combustion emissions presented in this analysis were calculated using Pinal County specific emissions[49] from EPA's NONROAD model,[50] which were then allocated to the modeling domains based on the methodologies described below. The NONROAD model calculates emissions from a varied assortment of equipment that is generally categorized as follows:

- Recreational vehicles (e.g., all-terrain vehicles and off-road motorcycles);
- Logging equipment (e.g., chain saws);
- Agricultural equipment (e.g., tractors);
- Commercial equipment (e.g., welders and compressors);
- Construction and mining equipment (e.g., graders and backhoes);
- Industrial equipment (e.g., forklifts and sweepers);
- Residential and commercial lawn and garden equipment (e.g., leaf and snow blowers);
- Recreational and commercial marine vessels (e.g., powerboats and oil tankers);[51]
- Locomotive equipment (e.g., train engines and support equipment); and
- Aircraft (e.g., aircraft and ground support equipment).

It is important to note that with the exception of aircraft, none of the nonroad vehicles and equipment listed above were federally regulated until the mid-1990s.

EPA utilizes a "top down" approach, and has based NONROAD default equipment populations on national averages, which are then scaled down to represent smaller geographic areas (i.e., statewide and countywide) on the basis of human population; employment and construction statistics; acres of harvested cropland; and proximity to recreational, industrial, and commercial facilities within each area. In the absence of equipment populations and activity estimates specific to the Pinal County region, the default NONROAD estimates for equipment population, growth rates, and annual and seasonal activity rates (all of which incorporate some degree of regional adjustment) were used for this analysis.

Note that the growth factors (developed for NONROAD in calendar year 2002) that determine future equipment population totals appear to accurately account for the rapid pre-2008 growth rates, but do not reflect the results of the economic downturn that affected the U.S. beginning in the 2007-2008 timeframe. Specifically, NONROAD assumes the following annual growth rates for construction equipment:

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[49] Input files are included in Exhibit 8.
[50] U.S. EPA NONROAD Model, Version 2008a, released July 2009.
[51] The NONROAD model is not capable of modeling emissions from oil tankers or other comparably large vessels, train engines, or aircraft.

- CY 2000-2005: 10.5%
- CY 2006-2010: 9.8%
- CY 2011-2015: 8.9%

These rates agree reasonably well with the 2000-2008 Pinal County human population[52] growth rate of 11.9%, and with the average annual growth rate for the number of residential building permits[53] issued in Pinal County over the same time period (i.e., 12%). Because of this overall agreement, and because this relatively small emission source does not justify the time-consuming commensurate adjustments to NONROAD activity rates that would be required if a more precise growth factor were to be developed, the default NONROAD growth rates for construction equipment were used for the 2008 baseline inventory.

NONROAD Calculation Methodology – EPA's NONROAD emissions model calculates emissions from each source according to the methodology shown below. Note that this calculation yields emission results in grams per year, which the model converts to tons.

$$\text{Emissions} = EF \times DF \times P \times LF \times \text{Hours} \times \text{Units}$$

where:

EF = emission factor in g/hp-hr
DF = deterioration factor (dimensionless)
P = power in horsepower
LF = load factor (dimensionless)
Hours = annual operating hours for each unit
Units = total population of engines operating in a given year

Pinal County Inputs – Total emissions estimates for Pinal County were determined for four specific months (January, April, October, and November)[54] during calendar year (CY) 2008[55] using average ambient temperatures specific to each.[56] CY 2008 wintertime fuel parameters for both Diesel and gasoline, shown below in Table 3-42, were obtained from the 2008 North American fuel surveys published by the Alliance of Automobile Manufacturers (AAM), and were verified by staff at the PCAQCD; it is assumed that the fuel mix used in Phoenix during the four months of interest is delivered to all areas of Pinal County as well, because the fuel requirements are the same in both areas during this period.[57] Gasoline and Diesel parameters are based on values reported in the Phoenix area, which are the same as those for Pinal County fuel during the four months of interest.

Equipment Categories – With the exception of equipment in the "Pleasure Craft" and "Railway Maintenance" equipment categories, all NONROAD equipment categories were

[52] See *http://censtats.census.gov/*
[53] See *http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl*
[54] These are the months during which the design days occur.
[55] Although this baseline analysis is focused on these four specific months, the annual emissions inventory will include CY 2008 total based on a NONROAD model run for CY 2008.
[56] See http://www.weatherforyou.com/
[57] Confirmed via telephone conversion with Scott Dibiase at the PCAQCD.

included in the analysis. These equipment categories were excluded due to the absence of recreational areas and rail yards in the modeling domains that would accommodate their use. Note that the NONROAD model estimates that 12.5% of CY 2008 Pinal County PM emissions are due to the operation of recreational equipment during three of the four months of interest. Shown in Table 3-43 are the equipment types with a Pinal County population greater than zero that NONROAD includes in this category, as well as the activity rates (in units of hours per year) assumed for each.

Table 3-42
NONROAD Modeling Fuel Parameters
Pinal County – CY 2008

Fuel Parameter	NONROAD Default	Pinal County (2008)
Fuel RVP for gas	8.0	8.8
Oxygen Weight (%)	2.44	3.5
Gas Sulfur (%)	0.0339	0.0015
Diesel Sulfur (%)	0.0351	0.0006
CNG/LPG Sulfur (%)	0.003	0.003
Stage II Control (%)	0	0[a]
EtOH Blend Market (%)	75.1	100
EtOH Volume (%)	9.3	10

a. Note that while Stage II controls are required at the highest-volume stations in Pinal County's "Area A," we assumed zero Stage II coverage because none of the modeling domains are located within Area A boundaries.

Table 3-43
Pinal County NONROAD Recreational Equipment

Equipment Category	Equipment Description	Activity Rate (hrs/yr)
Recreational Equipment	Motorcycles: Off-Road	1600
	All-Terrain Vehicles	1608
	Golf Carts	1080
	Specialty Vehicle Carts	65

Nonroad Emission Allocation Methodology – Several different methods were used to spatially allocate the county-wide emission estimates to the low wind modeling domains. A description of each method is presented below.[58]

[58] Please see Section 3.1.1.11 for a description of how emissions were allocated to Indian Reservations.

- *Recreational Equipment* – A population and geographically based allocation approach was used for this equipment category. County-specific census block data were obtained and were used to distribute the NONROAD emissions for this equipment over each modeling domain. Emissions associated with this category were further allocated within each domain based on the percentage of total miles of off-road equipment trails (used by off-road motorcycles and ATVs) located within each domain, vs. the total miles of trail within Pinal County.

- *Industrial and Commercial Equipment* – A population-based allocation approach was used for this equipment category; NONROAD equipment emissions were distributed over the modeling domain in proportion to its human population, compared to the county-wide population total. Within each domain, the emissions were then further allocated to specific developed rural and urban area parcels, in proportions equivalent to the size of each parcel.

- *Residential and Commercial Lawn and Garden Equipment* – NONROAD emissions associated with this equipment category were allocated to the modeling domains using the methodology described for industrial and commercial equipment, which considered both human population and acreage of developed land within each area.

- *Construction Equipment* – NONROAD emission results were allocated to the modeling domain (none of which include more than one county) based on information obtained from county-specific construction permits, which include total acres involved in the construction activity. Specifically, emissions were allocated according to the total acres of construction activity within each domain compared to the total acres of construction activity in Pinal County.

- *Agricultural Equipment* – Agricultural equipment emissions include combustion emissions from the NONROAD model, combined with fugitive dust emissions that were calculated using harvested and tilled acreage specific to each modeling domain, as described in the Agricultural Activities section. The NONROAD combustion emissions were allocated to each modeling domain based on the total acres of agricultural land in each modeling domain vs. the countywide total of agricultural land. The emissions associated with each domain were then further allocated to individual parcels based on the percentage of harvesting and/or tillage activities associated with each parcel, compared to the total harvesting and/or tillage activities for the domain.

3.1.1.6 Trackout Methodology

Surface loadings of material on roadways have many sources, including wind transport, spillage of transported material; trackout from industrial, agricultural, and construction sites with unpaved roads; and trackout from unpaved parking lots, driveways, and staging areas. These actions replenish material that is re-suspended by vehicles traveling across road surfaces. Locations with elevated silt loadings are referred to as "hotspots"—these typically occur where unpaved roads meet paved roads and there is regular vehicle activity to transport loose material onto adjacent paved road surfaces. Control of trackout has been found to be an effective particulate control measure in many communities.

Early on in the development of the emissions inventory, a decision was made by the ADEQ/PCAQCD advisory committee to adopt silt loadings used in calculating paved road fugitive dust in MAG's 2012 Five Percent Plan due to a lack of locally available silt loading data. Listed below are the values used for Pinal County (see the on-road emissions methodology discussion in Section 3.1.1.3).

- Freeways – 0.02 g/m^2
- High traffic arterials ($\geq$ 10,000 vehicles/weekday) – 0.067 g/m^2
- Low traffic arterials (< 10,000 vehicles/weekday) – 0.23 g/m^2

In the MAG analysis, trackout was associated with silt measurements of 0.3+ g/m^2. Measurements were obtained from samples collected manually on selected roadways and back calculated from emission measurements collected by an instrumented vehicle (i.e., SCAMPER – System for Continuous Aerosol Monitoring of Particle Emissions from Roadways) operated over a network of Salt River roads. Measurements incorporated into the MAG 2007 Five Percent Plan[59] included silt values ranging from 0.3-1.34 g/m^2 as representative of trackout. Higher values (up to 11 g/m^2) were reported in the Salt River TSD.[60]

Lacking any recent measurements of silt loadings on paved roads in Pinal County, particularly hotspots, but recognizing the potential exists for trackout because of the large number of unpaved roads with high activity levels, a request was made to PCAQCD staff to identify potential hotspot locations where high volume unpaved roads intersect with paved roads. The reasoning was that these locations were likely to have elevated silt levels because of the regular transfer of dry (and wet after rainfall) material to adjacent paved road surfaces. PCAQCD staff responded and identified (through general knowledge of the area confirmed by field verification) potential hotspot locations for Cowtown, Pinal County Housing, and Stanfield. Locations for each monitor/domain are presented in Figures 3-5, 3-6 and 3-7.

The largest potential for impact is at the Cowtown monitor along the adjacent Maricopa-Casa Grande Hwy. Several hotspots are within a mile, with the closest being 0.1 miles. To evaluate the potential for emission impacts from these sites, silt loadings were increased

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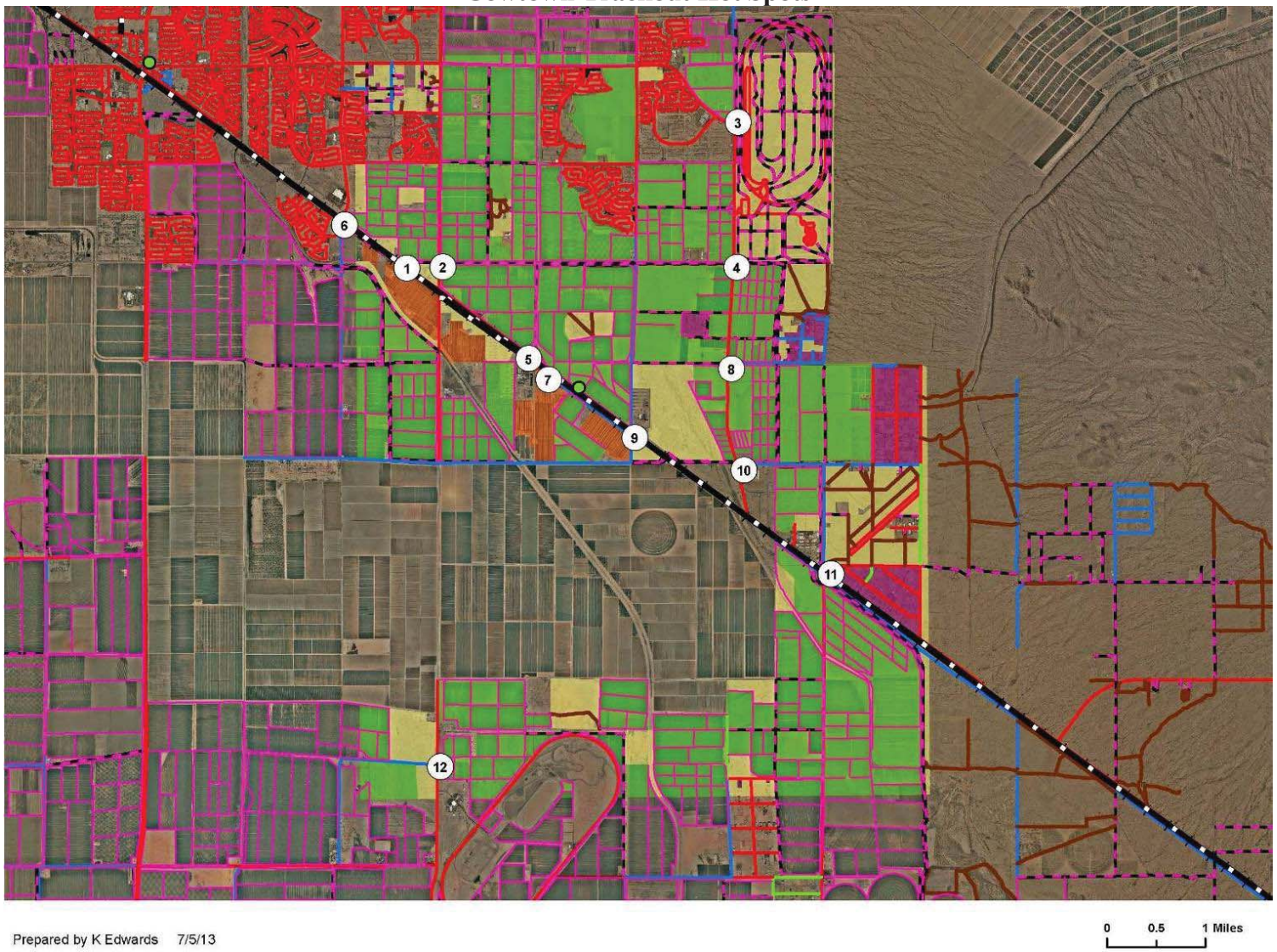
[59] "PM-10 Source Attribution and Deposition Study," Report No. 2008-03-01 prepared by Sierra Research for Maricopa Association of Governments, March 2008

[60] "Revised PM_{10} State Implementation Plan for the Salt River Area, Technical Support Document," ADEQ Air Quality Division, September 2005

from 0.23 g/m^2 to 1.0 g/m^2 (assumed based on the range of 0.3-1.34 g/m^2 reported previously from MAG's 2007 Five Percent Plan) between the end points marked by PCAQCD. The goal was to use a conservative increase to assess the potential impact. Similar silt loadings were used to quantify the impact of trackout at the other locations identified by PCAQCD staff in Figures 3-5, 3-6, and 3-7.

As discussed in Section 3.1.1.3, the default 0.23 g/m^2 silt loading produces an emission rate of 0.69 g/mi. Increasing the silt loading to 1.0 g/m^2 increases the emission rate to 2.63 g/mi (increasing the emission factor 381% of its original value) . The impact of this increase depends on the level of travel (i.e., VMT) across roads with trackout, which is a function of road mileage with elevated silt loadings and average daily traffic (ADT). Since the extent of roadway with increased silt loadings is unknown, it was assumed that the increase would extend between endpoints of applicable road segments (i.e., to the next intersection). In the case of the Maricopa-Casa Grande Highway, the entire segment included within the Cowtown monitoring domain was assumed to have trackout, due to the number of hot spots identified by PCAQCD staff.

Figure 3-5
Cowtown Trackout Hot Spots



Prepared by K Edwards 7/5/13

Figure 3-6
Stanfield Low Wind Hot Spots

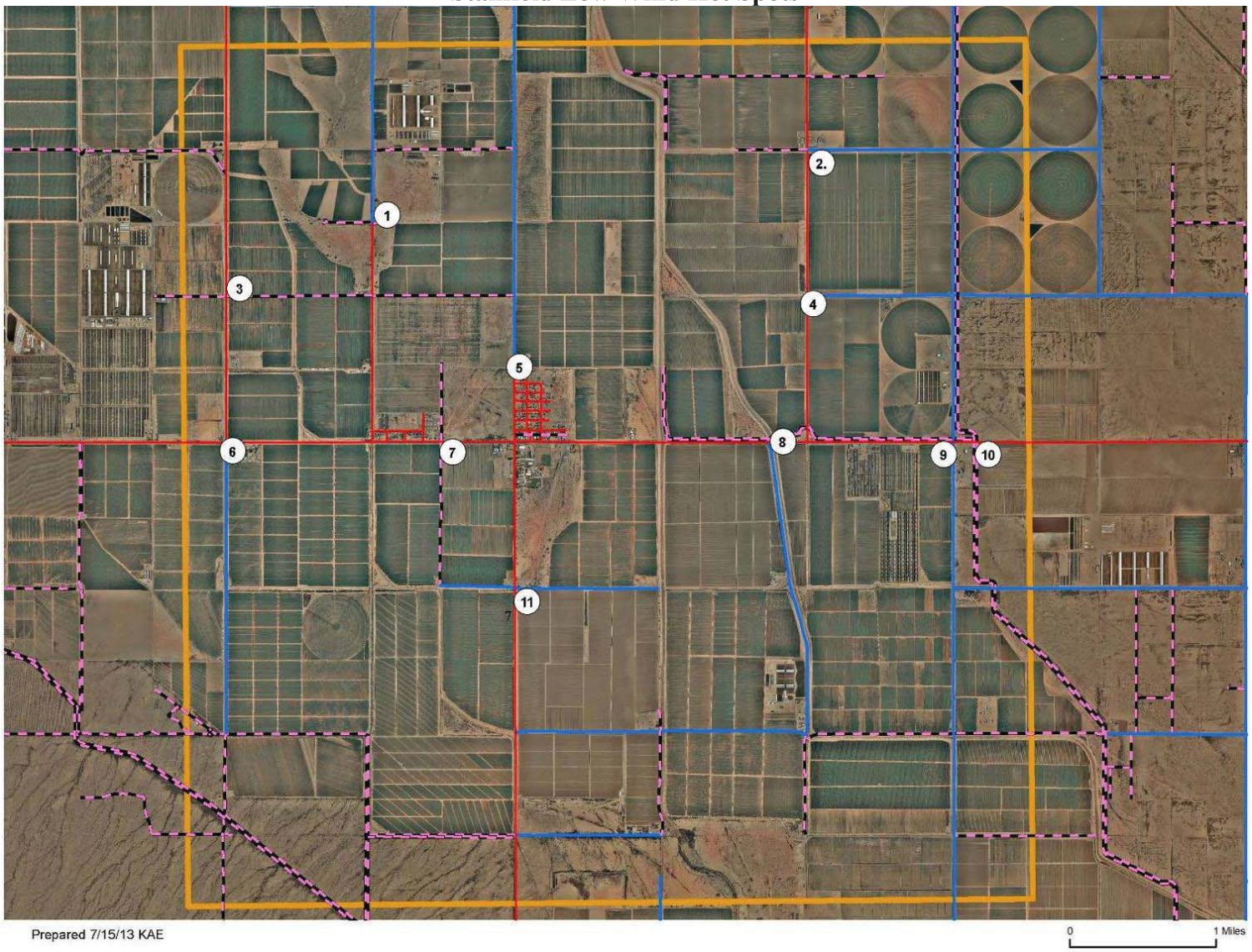
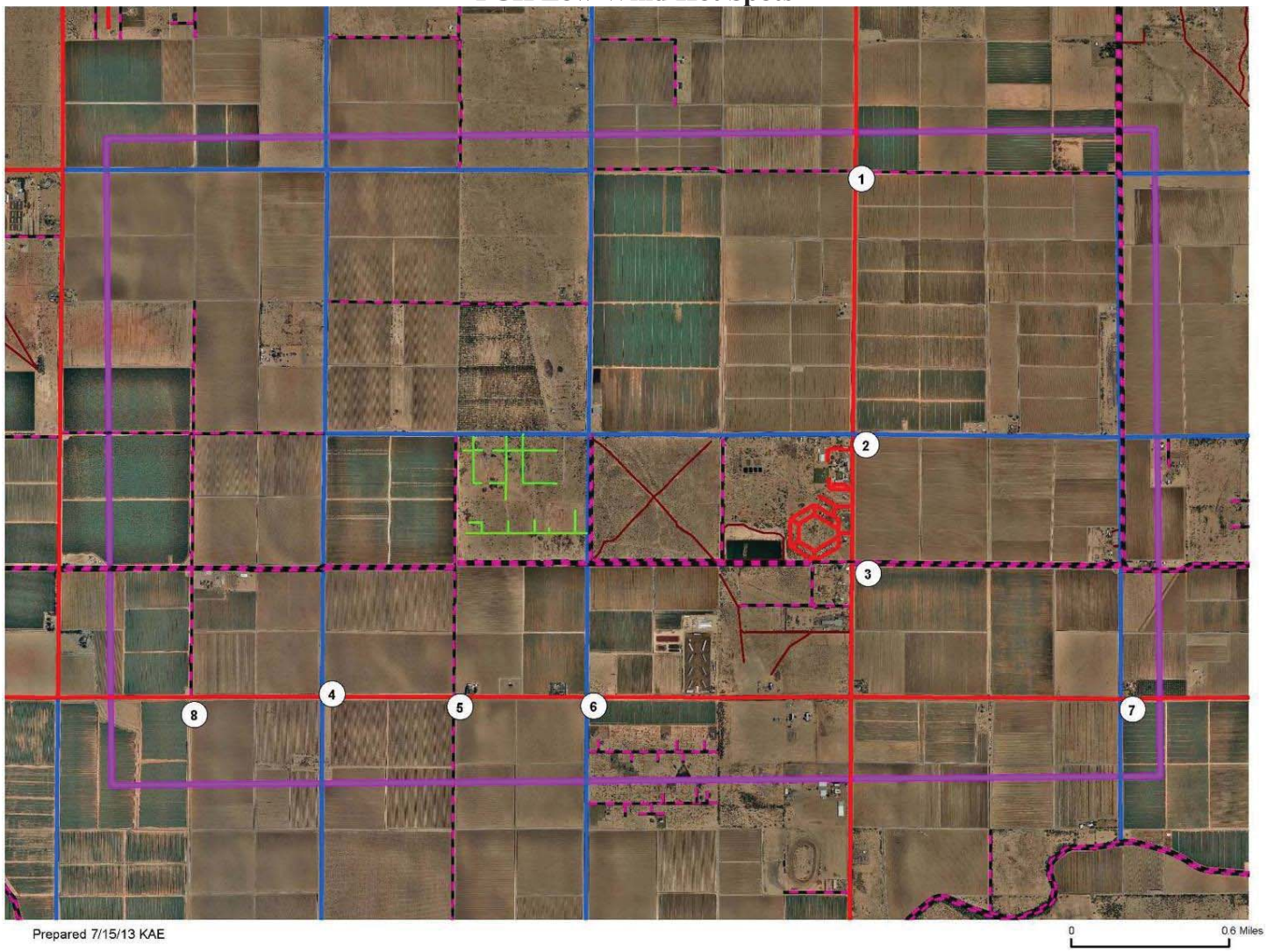


Figure 3-7
PCH Low Wind Hot Spots



3.1.1.7 Railroad Emission Methodology

PM_{10} emission rates for railroad operations within the Cowtown low wind attainment demonstration modeling domain were derived from EPA emissions studies and industry financial reports. This Cowtown domain is the only one evaluated in this plan that hosts an active rail line and locomotive emissions. A Union Pacific Railroad (UPRR) main line runs parallel and to the south of the West Maricopa-Casa Grande Highway (Arizona Route 238), adjacent to the feedlots on Cowtown Road and within 300 feet of the Cowtown monitoring station. The frequency of trains passing the monitor on an annual average day in 2008 has been difficult to quantify accurately as this information cannot be readily obtained from the carrier. Information provided by ADOT on a proposed project to construct a grade-separated crossing of this main line by Arizona Route 347 within the Maricopa city limits reports train frequencies in 2012 to be 40 to 60 per day.[61]

<u>PM_{10} Emission Factor</u> – EPA summarized emissions factors for locomotives in a 2009 study.[62] The PM_{10} emission factor averaged over the line haul locomotive fleet in the United States is reported as 5.1 grams emitted per gallon of Diesel fuel consumed. This factor can be converted to activity units of engine brake-horsepower hours by dividing it by 20.8 bhp-hr/gallon of fuel consumed, producing a PM_{10} emission factor of 0.245 g/bhp-hr. No information could be found on the average speed of trains traversing the main line section between Maricopa and Casa Grande during October 2008. UPRR reported to the American Association of Railroads, however, that the average speed traveled by trains in its system in October 2008 was 24.0 mph.[63] A typical line haul locomotive is rated at 4400 bhp and operates at a fleet wide load factor of 27.5% on level ground at 24.0 mph.[64] Applying these factors to the emission factor above produces a PM_{10} emission rate of 296.5 g/hr-locomotive. Line haul trains typically operate with three locomotives, resulting in train emissions of 889.4 g/hr-train. At an average speed of 24.0 mph, the PM_{10} emissions from each train passing the Cowtown monitor is 37.06 g/mi.

<u>PM_{10} Emission Rate</u> – The line haul trains are assumed to have passed the Cowtown monitor in 2008 at a maximum rate of 60 per day, based on the ADOT Maricopa grade-crossing project information. At this frequency, the PM_{10} emissions from each mile of track would be 2,233.4 g/mi-day, or 4.90 lb/mi-day. This emission rate was used in the Cowtown low wind design day attainment demonstration modeling analysis to represent PM_{10} emissions from locomotives passing near the monitor.

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[61] State Route 347 at Union Pacific Railroad, Agency and Public Scoping Summary, ADOT, November 2012, *http://www.azdot.gov/highways/Projects/SR347_Union_Pacific_RR/PDF/Agency-Public-Scoping-Summary-Report.pdf*, accessed on July 15, 2013.

[62] Emission Factors for Locomotives, EPA-420-F-09-025, U.S. Environmental Protection, April 2009

[63] Performance Measures 2008, Union Pacific Railroad, AAR, *http://www.up.com/investors/attachments/reports/dwell/2008.pdf*, accessed on July 15, 2013

[64] "Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters Per Cylinder," EPA-420-R-08-001, U.S. Environmental Protection Agency, March 2008.

3.1.1.8 Construction

The location of construction activity and related fugitive dust emissions shifts from year to year. The best source of information for tracking activity within a specific domain and time period is dust control permits. PCAQCD staff[65] reviewed permits issued in late 2007 (4th quarter) and selected those that were most likely to continue into 2008; these were then combined with permits issued in 2008 to create a shape file of polygons identifying the location of each of the issued permits. A total of 2,874 sites were identified in the PM_{10} nonattainment area. The following information was provided for each site:

- Permit type;
- Site location coordinates; and
- Acreage.

Three types of permits were found in the file provided:

- 5 – Construction;
- 7 – Commercial Construction; and
- 8 – Site Development.

Discussions with PCAQCD staff confirmed that type 5 represented residential construction and type 7 represented commercial construction (as listed). Type 8 was assumed to represent commercial construction and accounted for 2% of the issued permits.

Since the duration of construction activity varies by project type, information on the starting date for each project is needed to assess whether it was active on specific design days. To address this, random starting dates from 10/1/2007 through 12/31/2008 were assumed for each residential construction site and for commercial development. The duration of residential construction were estimated to be six months, according to EPA's Emission Inventory Improvement Program (EIIP) guidance.[66] The duration of nonresidential construction were estimated to be 11 months according to the WRAP Fugitive Dust Handbook.[67] The estimates of project duration were used to count backwards from the design date to determine if a permitted site could be active on the design day. Thus, for example, any commercial project started more than 11 months prior to the day to be modeled was excluded from the inventory of sources that impacted that date. No construction activity was assumed to occur on weekends.

A modified version of the methodology used by Maricopa County to estimate the 2008 PEI[68] was used to estimate emissions for each project determined to be active on the design day. Emissions for each project were calculated by multiplying the number of acres times an emission factor that varies by project type (in units of tons/acre-month as shown in Table 3-44). The tons/month were converted to lbs/day by dividing its emission by the number

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[65] Email from Kate Edwards, Pinal County to Bob Dulla, Sierra Research, 2008 Construction Dust Permits, November 28, 2012.
[66] See http://www.epa.gov/ttnchie1/eiip/techreport/volume09/residn3.pdf
[67] See http://www.wrapair.org/forums/dejf/fdh/content/Ch3-Construction_and_Demolition_Rev06.pdf
[68] 2008 PM_{10} Periodic Emissions Inventory for the Maricopa County, Arizona, Nonattainment Area, Maricopa County Air Quality Department

of days per month (22 active days per month) of construction duration assuming number of weeks per month for a construction schedule that is assumed to run five days per week. The daily emissions in lbs/day were converted to hourly emissions (lbs/hour) by dividing the emissions by the number of hours of operation per day (10 hours/day, from 7 am to 5 pm, were assumed as number of hours of operation per day for each source). Thus, for a 5-acre residential project, monthly emissions are calculated to be 0.16 tons of PM_{10} (0.032 x 5) or 320 lbs of PM_{10} (2000 x 0.16). The 320 lbs are spread across 22 days and amount to 14.5 lbs/day. Uniform hourly values of 1.45 lbs/hour are assumed to be emitted between 7 am and 5 pm on a design day on which construction occurs for this permit.

Table 3-45 summarizes the number of land parcels under construction located within each modeling domain on both stagnation days and low wind hours of high wind days. As can be seen, the Maricopa domain was estimated to have the highest level of construction activity. Permitted sites in Pinal County are required to comply with construction dust rules that address site preparation, bulk material handling, and carryout activity and emissions. The efficiency of these rules is dependent on the distribution of emission sources on a given construction site and how these sources are controlled. In order to assess the distribution of emission sources on a construction site, ADEQ reviewed resolved construction site emissions for the South Bay Replacement Project[69] and assumed these emissions would be scalable between this project and the average Pinal County construction site. The report concluded that 2.0% of construction site emissions originate from combustion. These emissions would not be controlled by the Pinal County construction rule. The remaining emissions were combined into two categories for control purposes: 1) emissions from travel on a construction site, which comprise 92.3% of construction site emissions; and 2) earthmoving emissions, which comprise 5.6% of construction site emissions. ADEQ assumed compliance with the Pinal County construction rule would most likely result from watering traffic areas on construction sites once per day and pre-wetting / operational watering for earthmoving activities. ADEQ calculated average daily control efficiency for watering of traffic areas of 28.2%.

69 http://www.energy.ca.gov/sitingcases/southbay/documents/applicants/afc/SBRP%20AFC%20Volume%202/Appendix%208.1/Appendix%208.1F%20Emissions%20and%20Impact%20Analysis.pdf

Table 3-44 Average Construction Project Duration and Emission Factor by Project Type		
Project Type	Average Duration (Months)	Emission Factor (Tons PM_{10}/Acre-Month)
Residential	6	0.032
Commercial	11	0.27
Road – new paving, full depth reconstruction, lane additions	12	0.42
Road – sidewalk addition, chip-sealing, re-surfacing, general improvements	12	0.27

SCAQMD and WRAP suggest 50% control efficiency for construction site emissions for programs without well-defined control strategies[70]. Therefore, ADEQ assumed 50% control efficiency for pre-wetting / operational watering for earth-moving activities. This resulted in a calculated site-wide control efficiency of 28.8%.

Utilizing the PCAQCD generated 2008 GIS construction map, ADEQ determined that 99.5% of construction sites permitted were greater than 0.1 acres and would therefore be subject to the rule (i.e. construction rule penetration is 99.5%). Additionally, PCAQCD reviewed construction site inspections for 2008 and determined 69.9% of permitted sites were inspected in 2008, with a compliance rate of 85%. Based on this information and feedback from PCAQCD on compliance certification requirements and outreach programs, ADEQ estimated rule effectiveness to be approximately 80%, based on EPA guidance[71]. Given this information, construction rule control effectiveness was calculated as 23%. Emissions from all construction sites were reduced by this control effectiveness.

[70] http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf
[71] EPA, 2005. Emission Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, Appendix B.

Table 3-45 Active Construction Permits for Pinal County PM_{10} Modeling Domains in 2008		
Modeling Domain		# of Parcels
Pinal County Housing	Low Wind Day	1
	Low-Wind Hours on High-Wind Design Days	0
Cowtown	Low Wind Day	111
	Low-Wind Hours on High-Wind Design Days	183
Stanfield	Low Wind Day	1
	Low-Wind Hours on High-Wind Design Days	3
Maricopa	Low-Wind Hours on High-Wind Design Days	525

3.1.1.9 Permitted Source Emission Methodology

PM_{10} emissions rates for permitted industrial facilities were derived from the Pinal County Air Quality Control District (PCAQCD) permit files. PCAQCD permits provide estimates of PM_{10} emissions for stationary sources only—PM_{10} emissions from area sources such as unpaved road travel, livestock movement, and windblown dust were estimated separately and these separate methodologies are discussed elsewhere.

Cowtown Monitoring Station – Several industrial facilities with permitted sources were found to be operating in the Cowtown low wind modeling domain in 2008. Hourly emission data for stationary source processes and stacks were extracted from the current permits provided by PCAQCD for the following facilities:

- Arizona Grain, Inc./Eagle Milling Company, Inc. – Maricopa;
- Pinal Feeding Company – Maricopa;
- Pinal Energy, LLC – Maricopa;
- Arizona Casting – Maricopa; and
- The Scotts Company – Maricopa.

The annual PM_{10} emissions from the Pinal Energy and Arizona Casting facilities were reported by PCAQCD to be 7.9 and 2.4 tons per year, respectively, in 2008. The annual average daily PM_{10} emissions from these facilities were calculated to be 43.3 and 12.2 pounds per day, respectively. For modeling purpose, these daily emissions were assumed be distributed uniformly over the design day.

Review of the Arizona Grain/Eagle Milling permit indicated that two stationary sources at this facility emitted the majority of PM_{10}: the railcar unloading shed, and the airsweep systems that exhaust suspended PM_{10} from the railcar and truck unloading sheds. Annual PM_{10} emissions for the facility were reported by PCAQCD to be 14 tons per year in 2008. Based on this information, annual average daily PM_{10} emissions were calculated to be 76.5 pounds per day. For modeling purposes, these emissions were assumed to be distributed

uniformly over the design day because unloading a dedicated supply train requires more than 24 hours to complete.

The Pinal Feeding permit listed a number of material transfer points and emissions sources within the facility area dedicated to grain processing and storage. PCAQCD reported annual PM_{10} emissions from this facility to be 74.9 tons per year in 2008. Annual average daily emissions were calculated from this value to be 409.3 pounds per day. To expedite modeling of these emissions, these daily emissions were assumed to be vented from a volume source that enclosed all of the source release points. Emissions were assumed to occur for up to 4 hours per day between 6:00 am and 4:00 pm based on information provided by representatives of the company. In a sensitivity modeling run, emissions were switched on during the hours ending at 11:00 am, 12:00 pm, 2:00 pm, and 3:00 pm, when measured winds blew from this facility to the monitor on the low wind design day of October 29, 2008 to assure highest impacts at the monitor from facility operation.

The Scotts Company operates a bark and soil processing facility approximately 1.3 miles west of the monitoring station. Annual PM_{10} emissions from this facility were reported by PCAQCD to be 3.4 tons per year, which equates to 18.6 pounds per day of PM_{10} on an annual average day basis. In the absence of operating hour information, the processing line assumed to produce the majority of PM_{10} emissions was also assumed to operate for only two hours per day based on the maximum processing capacity of this line and the annual production rate of this product as specified in the permit. The modeling analysis assigned these operating hours to the period from 10:00 am to 12:00 noon, when winds were blowing from the facility toward the Cowtown monitor on the stagnation design day, to assure highest impacts at the monitor from facility operation.

Stanfield Monitoring Station – Two facilities are located within the stagnation modeling domain of the Stanfield monitoring station, G Farms and LP Steel. According to annual emissions data provided by PCAQCD, PM_{10} emissions in 2008 from G Farms and LP Steel were 1.26 tons per year and 0.03 tons per year, respectively.

Pinal County Housing Monitoring Station – One facility is located within the low wind modeling domain for Pinal County Housing (PCH): the Eleven Mile Corner Farmers Gin. This facility was reported by PCAQCD to have emitted 4.4 tons of PM_{10} in 2008; based on this, annual average daily PM_{10} emissions were calculated to be 24.0 pounds per day. On the stagnation design day, these daily emissions were assumed to be uniformly distributed over the hours between 7:00 am and 4:00 pm based on information contained in the facility permit issued by PCAQCD.

3.1.1.10 Dairy Emission Methodology

Although dairies are scattered throughout the PM_{10} nonattainment area, only two—Rio Bravo Dairy near Stanfield and Sidewinder Dairy near Pinal County Housing—are located within low wind modeling domains. Animal population estimates were provided by the United Dairymen of Arizona. PM_{10} emissions factors for dairy operations were derived from the Agricultural Best Management Practices for Livestock Operations guide

published by the Governor's Agricultural BMP Committee.[72] PM_{10} emissions factors for the following four different area source operations at dairies were combined into a single factor for use in computing average daily emissions from each facility:

- Unpaved access connections and equipment areas;
- Unpaved roads or feed lanes;
- Animal feeding, waste hauling and transporting, and
- Arenas, corrals and pens.

The combined factor of 5.21 lb/head-year was converted to 6.48 gm/head-day and multiplied by the reported livestock population at each facility in 2008 to produce a facility-wide daily emission rate. In the absence of specific activity data for dairies, emissions from unpaved road travel, feed lane travel, feed transfer, and animal corrals were assumed to be uniform between 6:00 am and 9:00 pm. For modeling purposes, PM_{10} emissions were assumed to be released from each facility at a height of 2.3 meters uniformly across a single area source covering all corrals and active unpaved roads.

3.1.1.11 Combustion Sources

Fuel combustion emissions were estimated for: 1) Fires – including prescribed, wildfires, and agricultural field burning; 2) Residential Fuel Combustion – from fuels including natural gas, oil, wood, and other; and 3) and open burning – including the residential and non-residential land clearing of debris. In the case where local permit data was available, this information was used for the estimation of combustion emissions in conjunction with EPA approved emission factors. In those instances where local permit data was not available ADEQ and PCAQCD allocated EPA NEI estimates of combustion emissions.

Fire Emissions – Fire sectors inventoried include emissions from prescribed fires, wildfires, and agricultural burning. ADEQ leveraged the use of two fire emission databases when estimating prescribed and wildfire emissions. The NEI reports data from individual prescribed and wildfires within each State including location, type (i.e. prescribed burns or wildfires), acreage burned, and estimated emissions. Data was submitted by ADEQ to the Fire Emissions Tracking System (FETS) for all fires reported to the State during 2008. FETS reports the same event specific data outlined for the NEI as well as additional information including fuel loading, fuel bed, etc.

Utilizing the data aggregated in the EPA NEI and FETS, ADEQ filtered fire event data for only those fires which occurred in 2008 within the nonattainment area. Event data was then subdivided based on fire type and emissions were summed for each fire type. Filtering of the data in this manner revealed that only 0.27 tons of PM_{10} were reported for prescribed fires and 1.77 tons of PM_{10} were reported for wildfires in the nonattainment area in 2008. Further analysis revealed that none of these emissions occurred on any of the design days.

Agricultural burning emissions were estimated by PCAQCD for the year of 2008 utilizing county burn permit data. PCAQCD reviewed all burn permit data for the year of 2008 and

[72] Agricultural Best Management Practices for Livestock Operations, As Adopted by the Governor's Agricultural Best Management Practices Committee on July 27, 2010.

separated those permits issued for agricultural purposes. Typical agricultural burning practice in Pinal County is to burn vegetation growing within ditch banks and surrounding fence rows for weed control. Therefore, PCAQCD used the total acreage of permitted agricultural burn land to estimate emissions utilizing the following equation:

$$E = A * F_{ditch\ bank-fence\ row} * FL * EF$$

where:

E = PM_{10} emissions [tons/year]

A = acreage of permitted agricultural lands for burning

$F_{ditch\ bank\ -\ fence\ row}$ = fraction of agricultural land determined to be ditch banks and fence rows through aerial photography (2.34%)

FL = fuel loading factor (3.2 tons/acre)[73]

EF = emission factor (15 lbs/ton burned)[74]

The calculated annual PM_{10} emissions from permitted agricultural burning (17.0 tons) were then scaled to account for nonpermitted agricultural burning. This was accomplished by reviewing all burn complaints received in 2008 and determining the number of operations that were permitted and the number that were unpermitted. It was calculated that approximately 5.0% of open burn complaints were unpermitted. This adjustment resulted in a 17.9 ton estimate of annual PM_{10} emissions from agricultural burning in the nonattainment area.

ADEQ then temporally allocated nonattainment area wide agricultural burning emissions assuming uniform temporal agricultural burning annually. Spatial allocation was achieved to individual domains by multiplying annual emissions by the proportion of agricultural acreage within a given domain as compared to the nonattainment area wide agricultural acreage.

Residential Fuel Combustion – Lacking local data, ADEQ relied on EPA NEI estimated county-wide emissions for residential fuel combustion of natural gas, oil, wood, and other fuels. County-wide emissions were allocated to the nonattainment area and to individual modeling domains based on the proportion of households within those given regions as compared to the county. 2010 US Census data was used for household allocation to census block resolution. When the entirety of a census block was not included within a domain, households were allocated utilizing the proportion of the area of each block within the domain as compared to the total area of the given census block.

[73] US EPA, AP-42, Fifth Edition, Volume I Chapter 2: Solid Waste Disposal. Oct 1992.
[74] ibid

Emissions were allocated temporally using a modified version of EPA's residential wood combustion temporal allocation methodology[75]. This methodology apportions annual residential combustion emissions seasonally by weighting individual days as to how many degrees below 65ºF that day's average temperature falls. One heating degree day is registered for each degree below 65ºF of that day's average temperature. ADEQ altered this methodology for individual hours throughout the year. Hourly temperature measured at each monitor of interest was analyzed and one heating degree hour was given for each hour below 65ºF. Annual residential fuel combustion emissions were then allocated temporally within each domain based on the number of heating degree hours for the given design day as compared to the annual total heating degree hours.

Open Burning – Residential, commercial, and debris land clearing emissions were evaluated individually and then aggregated in order to estimate total open burning emissions. Emissions for each of these sources was calculated in the same manner as described for agricultural burning; whereby PCAQCD issued permits were separated into individual usage types (i.e. residential, commercial, land clearing). Countywide acreage of permitted burn land was then aggregated by usage type. From total acreage, emissions were estimated using the equation:

$$E = A * FL * EF$$

where:

E = PM_{10} emissions [tons/year]

A = acreage of permitted lands for burning

FL = fuel loading factor (3.2 tons/acre[76] for land clearing and 200 lb/cu yd[77] for residential and commercial open burning)

EF = emission factor (15 lbs/ton burned)[78]

Emissions were then allocated from the county to the nonattainment area and individual modeling domains based on the proportion of domain to county-wide households for residential open burning and population for land clearing debris. Commercial open burning was estimated to only emit 0.6 tons of PM_{10} county-wide and was thus considered de minimis and not allocated to domains.

3.1.1.12 Unpaved Parking

Unpaved parking emission estimates utilized a modified version of the methodologies presented in the 2008 Maricopa County PM_{10} Emission Inventory for reentrainment.

[75] Eastern Research Group, Inc., Emission Inventory Improvement Program Volume III: Chapter 2. Jan 2001.
[76] US EPA, AP-42, Fifth Edition, Volume I Chapter 2: Solid Waste Disposal. Oct 1992.
[77] Eastern Research Group, Inc., Emission Inventory Improvement Program Volume III: Chapter 16. Jan 2001.
[78] ibid

Maricopa County estimated dust reentrainment emissions from parking lots assuming unpaved parking emissions would be limited to the urban corridor and would originate from a proportion of disturbed areas within cleared areas and vacant lots. Due to the rural nature of Pinal County, ADEQ assumed that unpaved parking lots are equally likely to occur on urban and rural lands. As such, ADEQ assumed that unpaved parking lots are likely to occur on three land uses described in Table 2-1: cleared areas, developed rural lands, and developed urban lands. Only the disturbed portions of those land uses are assumed to contain unpaved parking areas, as per the assumption described in the Maricopa County 2008 EI. During field verification, Maricopa County determined that 24% of disturbed lands were used for unpaved parking. Therefore, ADEQ assumed 24% of the disturbed portion of cleared areas (15% disturbed), developed rural lands (5% disturbed), and developed urban lands (2.5% disturbed) within the nonattainment area and the individual modeling domains were utilized for unpaved parking. Multiplying these proportions by the total acreage of each land use within a given domain results in an estimate of unpaved lot acreage within a given domain. Average VMT per parking lot acre per day was assumed to be the same as developed by Maricopa County (2.013 VMT/parking lot acre – day) using the equation:

$$VMT = ADT \times D \div A$$

where:

VMT = calculated vehicle miles traveled per parking lot acre per day

ADT = average daily traffic per parking lot [# of vehicles][79]

D = average distance traveled by each vehicle [miles][80]

A = average size of an unpaved parking lot [acres][81]

ADEQ then calculated the total domain VMT per day utilizing the acreage of unpaved parking lot and the average vehicle miles traveled per parking lot acre per day. Using the EPA AP-42 equation for unpaved industrial roads, Maricopa County estimated an unpaved parking lot emission factor of 1.365 lb/VMT. Domain specific unpaved parking emissions were then calculated for the Pinal County nonattainment area and modeling domains using the above emission factor and the average domain VMT.

3.1.1.13 Tribal Sources

Both the AK-Chin and Gila River Indian communities (GRIC) fall within portions of three modeling domains: the Low Wind Design Day at Cowtown, low wind hours of High Wind Design Day at Cowtown, and low wind hours of High Wind Design Day at Maricopa.

[79] Maricopa County estimated the ADT as 10 vehicles, the average mileage traveled by each vehicle as 0.031, and the average acreage of an unpaved parking lot as 0.154.
[80] ibid
[81] ibid

Contacts were established with the air quality staff at each community to request information on activities for key sources located within the design day modeling domains. Formal requests were submitted for the following:

- Unpaved Roads: Name, ADT, and speed for road links or categories of roads located within each of the modeling domains;

- Agriculture: GIS information on the size and location of each parcel, crops under cultivation in 2008, identification of fallow land, and insight into changes in crop distribution in subsequent years; and

- Point Sources: the coordinates, stack height and stack temperature, and emissions (and changes over time) for each source.

GRIC provided a copy of a 2007 emission inventory for the entire community[82] and traffic count data collected for 188 community roads in 2004.[83] Google Earth images[84] for Ak-Chin lands and unpaved roads and a map documenting the level of PM_{10} control on individual roads[85] were also received. While the GRIC emissions inventory provided source-specific emission estimates, it did not provide the detail needed to characterize activity and emissions on their lands within the design day modeling domains. A review of the traffic count data found that only three paved and three unpaved roads links fell within the design day modeling domains. For the unpaved roads, the counts were contrasted with estimates for similar road categories provided by PCAQCD. For paved roads, the counts were contrasted with travel model estimates provided by ADOT prior to obtaining TransCAD model data from MAG and discrepancies were noted. Given the limited sample size, a decision was made to use the TransCAD model data for paved roads to provide consistency in the paved emission calculations. Unpaved tribal road emission rates were assumed equivalent to the average emission rate from nontribal roads within a given modeling domain.

Presented below is a description of the methods used to quantify emissions within each of the tribal domains.

- Unpaved Roads –AK-Chin and GRIC unpaved roads within the Cowtown and Maricopa modeling domains were digitized in ARCGIS using aerial photography. There is no information on the ADT levels, the width of roads, the vehicle speeds on the roads, and traffic diurnal variation for these roads. To estimate the emissions for unpaved roads, the average ADT levels, the average emission rates, and the average diurnal variations of all non-trail, unpaved roads that fall into the rest of corresponding domains were calculated and applied to tribal unpaved roads. Estimates of travel activity on paved roads within the tribal domains were provided

[82] 2007 Emissions Inventory Update for the Gila River Indian Community, submitted to EPA, Region 10, January 2009
[83] Memorandum from Sandra Shade to Patricia Mariella, re Traffic Counts, April 7, 2004
[84] Email from Bryan Paris to Steve Calderon and Bob Dulla, *Ak Chin EI data for Pinal County SIP*, 5/10/13
[85] Email from Bryan Paris to Bob Dulla and Steve Calderon, *Maps*, 5/15/2013

by ADOT. Emissions on these roads were calculated using the paved road methodology.

- Agriculture – As discussed in Chapter 3, most of the low wind modeling domains fell within 6 km radius of the CRPC data provided for each monitor. The land use information provided by ADEQ/PCAQCD identified land parcels within the tribal domains and provided general information on uses (e.g., agriculture, etc.), but did not provide information on crop type. Since CRPC data provided no information on crop type within the tribal domains, a domain specific average emissions rate was computed for the crops included within the CRCP domains and was applied to each agricultural crop parcel in the tribal domain. Emissions on those parcels were calculated using the appropriate low wind methodology described in this section for agriculture.

- Point Sources – A review of point source data determined that no GRIC sources were located within either Maricopa or Cowtown modeling domains. Ak-Chin lands were determined not to have sources within the Cowtown domains.

3.1.2 High Wind Fugitive Dust Methodology

The methods described in this section describe the calculation of windblown dust emissions.

Background – Two different methods for quantifying high wind emission factors were proposed in the Inventory Preparation Plan (IPP).

- The ADEQ method back-calculates emission factors for upwind areas by regression analysis of wind speed, PM_{10} concentration, and the pattern of land use along the back-trajectory path. The method uses a least-squares approach to compute emission rates by wind speed range and land use type within a "footprint," or bounded area, responsible for a high fraction of PM_{10} impacts at the monitoring station. This method is summarized in a report entitled "A Method for the Back-Calculation of Wind-Blown Emission Factors from Field Measured PM_{10} Emissions."[86]

- The MAG method, which was employed in quantifying high wind emissions rates for the Maricopa County 2008 Periodic Emission Inventory (PEI) for PM_{10} and MAG's 2012 Five Percent Plan for PM_{10} for the Maricopa County Area, computes emissions as a function of land use, disturbance level, and wind speed; agricultural emissions are calculated using a U.S. Department of Agriculture (USDA) equation for soil erodibility. A copy of this methodology is presented in Exhibit 6.

Analysis – AERMOD, an EPA-approved dispersion model of general utility, was used to perform quality control assessments of the ability of each method to replicate emissions rates of area sources responsible for PM_{10} concentrations recorded during high wind hours.

[86] Arizona Department of Environmental Quality, 7/02/2012

Initial efforts focused on the 14 high wind hours at the PCAQCD's Pinal County Housing (PCH) monitoring station on January 1, 2008. Land use information provided by ADEQ and PCAQCD was used to support the calculation of parcel-specific emission estimates for key land use categories (e.g., agriculture, developed rural, developed urban, cleared area, desert shrubland, unpaved roads, etc.).

The ADEQ method calculated emissions factors for each of the land use categories located within the domain determined by the footprint model to be impacting the monitor. In the PCH proof-of-concept test, the modeling domain specified by the footprint model was considerably smaller than the domains proposed in the IPP, which were designed to encompass the one-hour back trajectories of high wind hours on each high wind design day. For each land use category, the footprint model computed PM_{10} emission factors within each of several user-specified wind speed ranges.

The MAG method used portable wind tunnel test data collected on soil surfaces dedicated to specific disturbance activities to compute wind speed-dependent PM_{10} emissions factors for most local land uses. Analysis of the test data, collected by Nickling and Gillies in 1986 in central Arizona,[87] suggested that land use was not a factor in constructing an emission factor equation for windblown PM_{10}, with one exception— PM_{10} emissions rates of agricultural soils did not follow the same trend with respect to wind speed that was common to the emissions rates of soils disturbed by non-agricultural activities. As a result, separate methodologies were used by MAG to estimate windblown PM_{10} emissions rates for agricultural versus non-agricultural lands in the Maricopa County area. The data collected by Nickling and Gillies on all non-agricultural lands were combined and used to generate an emission factor equation using a derivative of wind speed as the dependent variable. For computational ease, the equation was used to compute emissions factors for specific wind speeds designed to represent wind speed ranges spanning 5 mph intervals. These factors were then employed in each hour that the average of wind speeds measured by a set of regional monitors exceeded the threshold velocity for generating windblown PM_{10}.

MAG used a soil erodibility formula developed by the USDA to compute windblown PM_{10} emissions factors on agricultural lands.[88] This formula calculates emissions as a function of soil erodibility, climate, surface roughness, uncovered field width and vegetative cover, but does not use wind speed as a variable; it thus cannot replicate the relationship between PM_{10} concentration and wind speed that is strongly evident in Pinal County monitoring data on high wind days.

The MAG method also configured separate high wind modeling domains around the 1-hour back-trajectories of each high wind hour in the design day. The modeling of PM_{10} impacts from area sources along these back-trajectories revealed that emissions from area sources within a few miles of the monitor dominated the concentrations measured at the monitoring station. This understanding led to the IPP design of high wind modeling domains at the

[87] "Evaluation of Aerosol Production Potential of Type Surfaces in Arizona," W.G Nickling and J.A. Gillies, EPA Contract No. 68-02-380, 1986

[88] "Development of Emission Factors for Fugitive Dust Sources," EPA 450/3-74-037, U.S. EPA, Research Triangle Park, NC, June; updated in September 1988 in "Control of Open Fugitive Dust Sources," EPA-450/3-88-008.

Pinal County attainment demonstration sites that were initially restricted to rectangular domains one mile long along the back-trajectory and two miles wide centered over the trajectory. The coordinates and land use designations of parcels within each domain were provided by ADEQ and PCAQCD. Parcel-specific information on crops under cultivation within a 6 km radius of each monitoring station was obtained from the Arizona Cotton Research and Protection Council (CRPC). The IPP proposed that emissions would be computed using the MAG non-agricultural emission factors and the USDA equation specific to the crops under cultivation within the restricted domain.

The ADEQ-derived emission factors were applied to the same domain and land use data employed in the development of the MAG-based high wind emissions inventory, with the thought that contrasting AERMOD-estimated hourly concentrations using the same meteorology and modeling domain with the different emission factors would be revealing.

A review of the initial results found several differences between the two methods, as outlined below.

- The ADEQ method did a better job of tracking changing hourly values, whereas the MAG method produced a more uniform result that was insensitive to speed or time of day.

- Both methods were found wanting in terms of their representation of agricultural emissions. The ADEQ method aggregated all agricultural land uses into a single factor, so there was no crop distinction. On the other hand, the USDA equation was found to produce windblown emission estimates that were orders of magnitude lower than the non-agricultural windblown emission estimates and therefore had little or no impact on the resulting hourly concentrations.

- The MAG method was found to be largely insensitive to wind speed because of the 5 mph speed bins, applied to the non-agricultural lands. A review of the wind speeds used shows that all of the high winds (at 10 meters) were addressed by two speed bins: 15-20 mph and 20-25 mph.

- The upwind area, defined by the ADEQ methodology, as impacting the PCH monitor was limited to a trajectory of roughly 400 yards, which was barely sufficient to reach nearby agricultural lands. This suggests little or no impact from sources outside of that very limited domain.

- The USDA equation has no term for wind speed. This means that modifications to other variables to more accurately represent Pinal County will show no diurnal variation, just more of a contribution to the total emission inventory.

After considering the advantages and disadvantages of both methods, the analysis evolved to consider several revisions/improvements in the MAG methodology to estimate high wind fugitive dust emissions in Pinal County, as described below.

- The MAG methodology for non-agricultural lands (disturbed and undisturbed) was revised to evaluate the effect of emission factors in 1 mph increments (using an

interpolation scheme), the development of these emission factors is described in Exhibit 5.

- Given that little difference was observed between agricultural lands and non-agricultural lands in the Nickling and Gillies report, MAG's method was revised to apply to agricultural lands with one modification—the vegetative cover factor was added to adjust emissions to account for crop-specific coverage effects (e.g., the factor for alfalfa is 0, whereas the factor for cotton is 0.7).

- The initial analysis of MAG's method applied uniform disturbance fractions to land use parcels in the upwind domain. Many of MAG's values, however, are not applicable to Pinal County because they were based on the results of field inspections. This led to a joint effort between PCAQCD and ADEQ to collect local observations and conduct a literature review of land disturbance levels used in other PM_{10} SIPS of similar climatology (e.g., Clark County, Imperial County, etc.). The literature review determined that in most cases, Pinal County has differentiated land use types to a greater resolution than the other SIPs analyzed. Thus, some judgment was applied, based on the available information, to prepare the summary of the resulting disturbance and stable land estimates presented in Table 3-46 for non-agricultural lands.

- ADEQ staff developed emission factor (EF) adjustment curves through an analysis of monitor-specific concentrations recorded during high wind hours (exceeding 12 mph) with steady wind direction. The EF adjustment curves account for Pinal County windblown emissions during sustained high winds and are assumed to account for saltation initialization periods, diminished particle supply, etc. Calculation of the EF adjustment curves is detailed in Exhibit 7.

Table 3-46 Disturbance Level for Non-Agricultural Land Used in Pinal High Wind Annual Emission Inventory			
Land Use ID	Description	Disturbance	Stable
A	Developed Urban Lands[a]	2.5%	0.0%
B	Developed Rural Lands (low density residential)	5.0%	95.0%
C	Paved Roads[89]	0.0%	0.0%
D	Unpaved Roads (Private Dirt, Ag Road, and Trail)	100.0%	0.0%
D	Unpaved Roads (Public Dirt)	75.00%	25.00%
E	Cleared Areas	15.00%	85.00%
F	Residential Construction[b]	44.4%	55.6%
G	CAFOs and Dairies	50.0%	50.0%
H	Desert Shrubland	5.0%	95.0%
J	Commercial Construction[b]	52.7%	47.3%
K	Other	10.00%	90.00%
L	Site Development[b]	47.9%	52.1%

a. In contrast to other communities, this land use category did not include urban fringe areas, but only lands within the urban core. Given the extensive surface coverage observed on urban core lands in Pinal County, the disturbance levels are limited and assumed to be 2.5%. The stable portion is assumed to have no emissions.
b. See discussion below on how these values were estimated.

- A review of the current Guide to Agricultural PM_{10} Best Management Practices (BMPs) and the related 2001 Technical Support Document found that BMP emission reduction estimates for wind erosion control measures were based on the USDA equation. The TSD, however, recognized that wind tunnel test data were used to estimate windblown emission factors in the micro-inventory study conducted at West Chandler and Gilbert, and that it was not appropriate to compare the results of the two different methods because each was appropriate for its specific spatial resolution and intended purpose.

To address the issues outlined above, separate methods were developed to calculate windblown emissions for agricultural lands, non-agricultural lands, and construction sites. A discussion of each follows.

Agricultural Windblown Emissions – Given the extent of agricultural land located within each modeling domain and the difficulty of developing observational estimates of disturbance levels by crop type, it was determined that estimates of disturbance should be interpreted from an existing data set. The crop calendar was selected to provide insight on crop-specific disturbance levels. Presented below is a summary of the approach used to extract that insight.

[89] Maintenance practices within the County ensure that paved roads have 0% disturbance and that there is no distinction between disturbed and stable. Therefore, for completeness purposes, paved roads are presented as a land use for windblown dust emissions, but this sector is assumed to contribute no windblown dust emissions.

A review of the information contained in the shapefiles provided by ADEQ/PCAQCD and by CRPC identified several different categories of agricultural land use within each modeling domain, including the following:

- CRPC crop lands – crop types CRPC identified for parcels under cultivation in 2008;
- Fallow lands – parcels CRPC identified as being fallow in 2008; and
- Other Agricultural Lands – parcels not addressed by CRPC, but identified by 2008 aerial photography as agricultural land.

The "Other" agricultural lands category includes (1) parcels identified by ADEQ/PCAQCD, through aerial photography and land ownership records, as agricultural but for which CRPC did not provide crop data for (i.e., lands within the overlap of the two shapefiles), and (2) parcels ADEQ/PCAQCD identified as agricultural, through land ownership records, located outside of the 6 km radial boundary supplied by CRPC.

The distribution of crop lands, including fallow land and Other ag lands, was calculated for each monitor/modeling domain from the CRPC and ADEQ/PCAQCD shapefiles. A summary of those values is presented in Table 3-47. The results show many crops were not identified by CRPC within the modeling domains as being actively cultivated in 2008; these are listed as N/A. The crop categories actively under cultivation within the domains include cotton, alfalfa, corn, grain, and, to a lesser extent, melons and orchards. Other Agricultural Land varies by monitor.

An understanding of the significance of agricultural lands within each modeling domain can be gained from a review of the agricultural land share presented at the bottom of Table 3-47. It shows agriculture has a dominant share of the modeling domains at PCH and Stanfield, a significant share of the Cowtown domain, and a more modest share of the Maricopa domain.

As discussed earlier, emissions are calculated separately for disturbed and stable land. The approach used to determine if CRPC crop lands were disturbed or stable was to review the crop calendar provided by PCAQCD (presented in Exhibit 3) and ask farmers for insight on design day activities. The ten-day period in which the design day occurred (highlighted in Exhibit 3) was reviewed to determine if any activity (i.e., harvesting, planting, etc.) occurred for each crop. The results, summarized in Table 3-48, show that design days for PCH, Stanfield, and Maricopa all occurred in periods when cotton was being harvested (scored with a "D" for disturbed), while the design day for Cowtown occurred in the spring, which had a mixture of activities

Table 3-47 Distribution of Crop Categories for Agricultural Lands Located in the High Wind Hours Modeling Domains (%)				
Crop	PCH	Stanfield	Cowtown	Maricopa
Cotton	24.9	23.6	5.1	0.4
Alfalfa	26.6	20.5	17.1	4.8
Corn	N/A	8.1	N/A	3.5
Grain	13.8	N/A	N/A	N/A
Melons	N/A	N/A	0.0	N/A
Orchard	N/A	N/A	3.8	N/A
Wheat	N/A	N/A	N/A	N/A
Barley	N/A	N/A	N/A	N/A
Sorghum	N/A	N/A	N/A	N/A
Other Vegetables	N/A	N/A	N/A	N/A
Citrus	N/A	N/A	N/A	N/A
Other Agriculture	8.9	17.8	20.7	18.3
Ag land share (%) of the domain	74.2	69.9	46.8	27.0

Note: NA denotes crops not identified within the modeling domains as being actively cultivated in 2008.

Table 3-48 Disturbance Assumptions for Agricultural Lands Identified in Cotton Research and Protection Council Shapefile for High Wind Modeling Domains					
Crop	VC	PCH	Stanfield	Cowtown	Maricopa
Cotton	0.7	D	D	D	D
Alfalfa	0.0	G	D	D	D
Corn	0.44	-	S	G	S
Grain	0.0	D	-	G	-
Melons	0.77	-	-	S	-
Orchard	0.77	-	-	S	-
Wheat	0.0	-	-	-	-
Barley	0.0	-	-	-	-
Sorghum	0.0	-	-	-	-
Other Vegetables	0.77	-	-	-	-
Citrus	0.77	-	-	-	-
Design Date		01/01/08	11/21/08	04/27/08	10/27/08
Previous Rainfall Date*		12/11/07	09/10/08	02/16/08	09/10/08

D = 100% disturbed
S = 100% stable
G = Growing season, 0% disturbed and 0% stable (During the growing season agriculture was assumed to have adequate ground cover to have negligible windblown emissions.)
* Rainfall data based on measurements at the Arizona Meteorological Network (AZMET) Maricopa station, as published at *http://ag.arizona.edu/azmet/az-data.htm*.

depending on the crop type. Crops being planted were also scored "D," while those between harvest and planting were scored with an "S" for stable, as no activity was assumed. Crops between planting and harvesting were considered in the growing period and were assumed to have adequate vegetation coverage to eliminate windblown dust emissions during high winds. As previously noted, insight gained from discussions with farmers about design day activities was used to modify crop calendar listings. For example, corn is shown to be actively harvested in October in the crop calendar, but farmers indicated that corn harvesting occurs earlier in the June/July/August time frame, so the disturbance assumption is listed as "S" instead of "D". A summary of the interpretation of the crop disturbance levels for each modeling domain is presented in Exhibit 3.

The next step was to identify the most recent date preceding the design day on which measurable rainfall (0.01") occurred to determine if soil moisture levels were sufficient to prevent particle entrainment. Three of the sites (Stanfield, Cowtown, and Maricopa) had a period of more than a month between rainfall and the design day. The shortest period was at PCH, which had 20 days between rainfall and design day—sufficient time for the soil to dry and not invalidate decisions about the land disturbance.

In addition to rainfall, a number of other factors can influence windblown dust emissions on agricultural lands, including crop canopy, post-harvest crop residue, etc. Since the influence of these factors is only partially addressed in the original Nickling and Gillies wind tunnel measurements and is also not readily available for Pinal County, the vegetative coverage (VC) factor employed in the USDA soil erodibility formula[90] was used to account for the collective effect of these factors on windblown dust production. The crop-specific values are displayed in Table 3-48. As can be seen, the dense vegetative cover produced by alfalfa eliminates windblown dust throughout the year, whereas cotton coverage reduces windblown emissions by 30%. To simplify the table, no information was extracted from the crop calendar for crops with a VC value of "0"or for crops not being actively cultivated as shown in Table 3-48. The disturbance values for those crops is represented by "-".

The equation used to calculate windblown dust emissions for disturbed agricultural land is shown as Equation 1 below.

$$Esj = F_{EFAdjusment} \bullet A \bullet EF_{Disturbed,bin} \bullet V' \qquad (1)$$

where:

Esj = suspended PM_{10} in gram/sec for hour j

$F_{EFAdjustment}$ = the emission adjustment factor for diminished particle supply

A = the area of each crop's land parcel, in m^2

[90] MAG used the soil erodibility formula to quantify high wind emissions from active agricultural lands in the Five Percent Plan.

$EF_{Disturbed,bin}$ = the windblown dust emission factor developed for disturbed soil for that wind speed bin, gram/m^2-sec for hour j (detailed in Exhibit 7)

V' = vegetative cover for crop specific, presented above in Table 3-48

The equation used to calculate windblown dust emissions from stable agricultural lands is presented below as Equation 2. (The same equation is used to calculate emissions for stable non-agricultural lands.) It assumes 100% stable land (P_{Stable}=1).

$$Esj = F_{EFAdjusment} A \bullet EF_{stable,bin} \bullet P_{stable} \qquad (2)$$

where:

Esj = suspended PM_{10} in gram/sec for hour j

$F_{EFAdjustment}$ = the Emission Adjustment factor

A = the area of each parcel, in m^2

$EF_{Stable,bin}$ = the windblown dust emission factor developed for stable soil for that wind speed bin, gram/m^2-sec for hour j (detailed in Exhibit 7)

P_{Stable} = the percentage of stable soil for agricultural land

For fallow lands and for Other Agricultural Lands, aerial photography was used to estimate the distribution of stable and disturbed land (90%/10%)[91]. Equation 2 was used to quantify windblown dust emissions for the stable portion of fallow and Other Agricultural Lands. Equation 1 without the crop coverage factor was used to quantify emissions from the disturbed portion of both land use categories.

Non-Agricultural Windblown Emissions – Information provided by PCAQCD staff on disturbance for non-agricultural lands, presented in Table 3-46, was used to quantify emissions for disturbed and stable lands. Equation 3 was used for computing windblown dust emissions for the disturbed portion of non-agricultural land:

$$Esj = F_{EFAdjusment} \bullet A \bullet EF_{Disturbed,bin} \bullet P_{Disturbed} \qquad (3)$$

where:

Esj = suspended PM_{10} in gram/sec for hour j

$F_{EFAdjustment}$ = the Emission Adjustment factor for diminished particle supply

[91] Aerial photography of other agricultural lands indicated that most fields ranged from recently being cleared Ag lands to fields which may have been out of operation for a significant period of time and are recovering towards becoming desert shrubland.

A = the area of each parcel, in m^2

$EF_{Disturbed,\ bin}$ = the windblown dust emission factor developed for disturbed soil for that wind speed bin, gram/m^2-sec for hour j (detailed in Exhibit 7)

$P_{disturbed}$ = the disturbed level, in percentage for each category of non-agricultural land, specified in Table 3-46

Equation 4, which is essentially the same as Equation 2, was used to quantify emissions for stable non-agricultural lands:

$$Esj = F_{EFAdjusment} A \bullet EF_{stable,bin} \bullet P_{stable} \qquad (4)$$

where:

Esj = suspended PM_{10} in gram/sec for hour j

$F_{EFAdjustment}$ = the Emission Adjustment factor

A = the area of each parcel, in m^2

$EF_{Stable,bin}$ = the windblown dust emission factor developed for stable soil for that wind speed bin, gram/m^2-sec for hour j (detailed in Exhibit 7)

P_{Stable} = the percentage of stable soil for agricultural land for each different non-agriculture land, detailed in Table 3-46.

Construction – Industry representatives were unable to provide insight into soil disturbance levels on construction sites adequate to estimate an average construction site disturbance ratio. ADEQ reviewed literature and found that the WRAP Fugitive Dust Handbook[92](section 3.2.2) provides estimates of the disturbed soil footprint for the construction of different structures. ADEQ therefore, used the following methodology when estimating the average site-wide percentage of disturbed land for residential, site development, and commercial construction site permits.

ADEQ leveraged Pinal County zoning maps and PCAQCD's construction permit map to determine the likely structure occurring on a given construction lot. First, the zoning map was overlaid on the construction permit map and those lots occurring in non-residential, non-rural zones were excluded. Residential lots were then grouped by their zoning subgroups (e.g. 2-4 family residences, suburban ranch, etc.) and subgroups were sorted by acreage. The top and bottom quartile of sites were then excluded in order to insure adequate representation of average residential construction sites were used for the calculation. Given that certain zoning subgroups identify a minimum lot size on which a home can be built, ADEQ took steps to conservatively estimate the maximum number of homes being built on each lot. For residential sites in these zones, ADEQ assumed the maximum whole number of homes were being built on each lot in order to comply with

[92] http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

the minimum lot size requirement. In those instances where a lot was smaller than that required to build one home, ADEQ still assumed one home was built on the lot. For those lots which are in zones not assigning a minimum size (these lots average approximately 0.3 acres in size), ADEQ assumed one home was built. ADEQ was then able to assign disturbance acreage to each lot based on the number of homes assumed built on the lot and the type of home built on the lot (determined based on zoning maps). For single family homes, WRAP recommends a 0.25 acre disturbed area (assuming a 2,000 sqft/floor home). For multi-family homes, ADEQ assumed duplexes were built. WRAP suggests 0.33 acre of disturbed area for duplexes (assuming a 3,500 sqft/floor home). For prefabricated homes ADEQ assumed the duplex ratio of disturbed land to home size would be scalable to the average size of a prefabricated home. Based on the 2008 U.S. Census, the average single prefabricated home size is 1,100 sqft.[93] The percent disturbance of each lot was then calculated and reduced to 100% when necessary. An average disturbance ratio was calculated for each zoning group. An overall average residential construction disturbance ratio was then calculated as the weighted average of zone disturbance ratios, weighted by total residential construction area associated with each zoning group. The calculated average residential construction disturbance ratio is 84.3% disturbed and 15.7% stable for a given lot.

Site development permit disturbance ratio was calculated in a similar manner to residential construction permits. The total acreage for multi-family housing developments was calculated. The disturbance percentage calculated for multi-family housing developments in the previous residential construction sites was assumed. The same approach was used for site development permits zoned for single-family housing. The only remaining site development permits zoned were classified as "Residential Transitional". This zone was ignored since no information on the disturbance level is reported for this zone. The site development permit disturbance ratio was then calculated as the weighted average of the disturbed portions for the single-family and multi-family zoned projects as 90.8% disturbed and 9.2% stabilized.

For commercial construction permits, detailed characterization of local nonresidential construction was unavailable; therefore, ADEQ conservatively assumed a ratio of 100% disturbed to 0% stabilized for these construction sites.

Finally, the ratios listed above assume no dust control on a given construction site and are thus overestimates of the construction site disturbance that would be expected to occur in Pinal County. In 2008, construction sites permitted in Pinal County were subject to the Pinal County construction dust control rule. This rule essentially required the implementation of controls adequate to reduce visible emissions from a construction site to 20% opacity. ADEQ does not have an adequate estimate of the control efficiency of this rule since PM_{10} mass reductions are not quantifiable from visible emission controls. As watering is a viable option and one regularly used on construction sites in the neighboring PM_{10} nonattainment area in Maricopa County, a 50% control effectiveness for emissions from construction sites was assumed (in line with the 50% reported control effectiveness utilized in Section 3.3.1 of the WRAP Fugitive Dust Handbook for water controlled

[93] https://www.census.gov/construction/mhs/pdf/sitebuiltvsmh.pdf

construction sites[94]). Reduction of emissions by 50% resulted in the following average equivalent disturbance ratios for construction sites:

- Residential Construction Site: 44.4% Disturbed & 55.6% Stabilized
- Site Development: 47.9% Disturbed & 52.1% Stabilized
- Commercial Construction Site: 52.7% Disturbed & 47.3% Stabilized

Low Wind Hours on High Wind Days – The emission estimates for the low wind hours during high wind days are calculated using the source-specific emission estimates outlined earlier in the low wind section of this chapter. A description of the methods used to select the low wind hour domains on high wind days is presented in Section 2.2.

Activity-Based Emissions – Activity-based construction emissions were quantified within the low wind domains for each hour of the high wind days. Because the areal extent of these domains encompassed the high wind domains, activity (or mechanically) driven emissions for sources located within the high wind domains could be extracted for the high wind hours in the modeling analysis.

Paved Roads – Paved roads were assumed to contribute only activity related emissions from vehicle traffic. As this land use is covered by an impermeable layer, it is assumed that it will not contribute to windblown dust emissions. This land use is therefore given a disturbance : stability ratio of 0% : 0%.

3.2 Emission Methods – 2018

In the interest of brevity, the data and methods used to quantify emissions for each category discussed in Section 3.1.1 and 3.1.2 will not be repeated, except where revisions were made to support forecasts for 2018. The sequences of source descriptions will follow those employed in those sections.

3.2.1 Low Wind Methodologies

Agriculture – As no reliable projection information is available to estimate agricultural growth or market demand for individual crops, no change were made to the amount of land under cultivation, the distribution of crops, or the methods employed in the 2008 calculations. Agricultural emissions were held constant from 2008 to 2018.

CAFO – Emission estimates for CAFOs were calculated for 2018 using the methodology presented in Section 3.1.2. While the same method was used, the estimates of the cattle population were revised to address the closure of feedlots that have occurred to date and projected populations are supplied by industry contact. A summary of facility-specific populations during the design days are presented below in Table 3-49. The 2008 design

[94] http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

day head counts are based on the October 2008 cattle head counts provided by Arizona Cattle Feeders Association.[95]

The cattle head counts on Dec. 31, 2012, were also provided by Arizona Cattle Feeders Association. Based on these 2012 values, a conservative approach was used to project the cattle counts to 2018:

- For the CAFOs near Cowtown monitor, the data provided show that four facilities were closed after 2008: Pinal Feed East, Maricopa Cattle Co. East, Maricopa Cattle Co. West, and Owen Kelly Feed Yard. Only two facilities—Pinal Feed East (W Fuqua) and Pinal Feed West (E Fuqua)—operated after 2011, and the cattle populations for these two facilities declined from 2008 to 2012. Since operations and market demands change from year to year, the 2008 values were retained to represent a conservative estimate of activity at these facilities.

Table 3-49
Summary of Cattle Population Values
in the Pinal County PM_{10} Nonattainment Area
2008 – 2018

Facility	2008	2018
Pinal Feed East	18,426	0
Pinal Feed West (W Fuqua)	15,543	15,645
Pinal Feed West (E Fuqua)	33,286	33,497
Owen Kelly Feed Yard	5,900	0
Maricopa Cattle Co. West	19,828	0
Maricopa Cattle Co. East	17,163	0
Red River Feed Yard	52,315	48,452
Benedict Feed Yard	52,263	37,000
Paradise Cattle	2,400	NA
Totals	217,124	134,594

Source: Bas Aja/Arizona Cattle Feeders Association
The Paradise Cattle location ceased operation as a CAFO between 2008 and 2018

[95] Email communication between Bas Aja/Arizona Cattle Feeders Association and staff of the Arizona Department of Environmental Quality.

- For the two CAFOs facilities (Benedict and Red River Feed yards) near the Stanfield monitor, the cattle population increased from 2008 to 2012. The Arizona Cattle Feeders Association forecast of 37,000 cattle for the Benedict Feed yard was used to represent 2018 activity at that facility. The Arizona Cattle Feeders did not provide a forecast for the Red River facility in 2008. Lacking any insight into growth, the most recent values from 2012 were held constant through 2018.

- The net result of these changes is that the cattle population is forecast to decline by 38% (82,530 head) between 2008 and 2018.

On-Road Mobile Source Emissions Modeling for Paved Roads – Projected mobile source emissions were generated for the year 2018 as part of the PM_{10} attainment modeling for Pinal County. Mobile activity was grown from 2008 using population projections developed by MAG for the year 2018.MAG developed travel activity on road segments by utilizing the Maricopa Association of Governments' (MAG) TransCAD modeling for the Pinal PM_{10} nonattainment area. Values for 2018 vehicle activity were interpolated based on the results of the 2015 and 2025 TransCAD simulations.

MOVES Configuration – Described below are the inputs used in configuring the MOVES model for the creation of episode-specific emission rates tables. For nonattainment are wide MOVES runs, the road network was estimated using MAG's developed centroid connector road network. For design day MOVES modeling, the centroid connector specific information was apportioned to the actual paved road network so that ADEQ could accurately spatially distribute emissions within each modeling domain during subsequent AERMOD and rollback modeling for monitor impacts.

Average Speed Distribution – The 2018 speed distributions were calculated from the TransCAD model outputs based on link-specific flow, time, and speed outputs. VHT is calculated using the vehicle flow and time on a given link. Speed fractions can then be found through a weighted average of speed by VHT for each road type. The link speeds for 2018 were calculated by interpolating between the 2015 and 2025 TransCAD outputs. MOVES requires speed distribution information organized by vehicle types, road types, hours, and days. As with 2008, the speed fractions did not vary across vehicle type or day of week for the 2018 inputs.

Road types were determined based on the TransCAD area types and facility types shown in Tables 3-50 and 3-51. The equivalent MOVES roadTypeID for a set of facility and area pairings is shown in Table 3-52. Each RoadTypeID can be mapped from several different permutations of area and facility type.

Modeled vehicle speeds must be translated into one of 16 speed bins in the process of creating this input field. Table 3-53 shows the relationship between the 16 speed bins and the average speed and speed ranges.

Table 3-50 Road Area Types for TransCAD Model Outputs	
Area Type	Description
1	Central Business
2	Urban
3	Urban Fringe
4	Suburban
5	Rural

Table 3-51 Road Facility Types for TransCAD Model Outputs	
Facility Type	Description
0	Freeway HOV lane
1	Freeway
2	Expressway
3	Collector
4	6 Legged Arterial
5	Centroid Connector
6	Major Arterial
7	Unmetered Ramp
8	Freeway Metered Ramp
9	CD Road
10	Parkway
11	Unpaved Road

Table 3-52 RoadTypeID Mapped to TransCAD Area and Facility Types			
Road Description (MOVES)	Road Type ID (MOVES)	Area Types (TransCAD)	Facility Types (TransCAD)
Rural Restricted Access	2	5	0,1,7,8,9
Rural Unrestricted Access	3	5	2,3,4,5,6,10,11
Urban Restricted Access	4	1,2,3,4	0,1,7,8,9
Urban Unrestricted Access	5	1,2,3,4	2,3,4,5,6,10,11

Table 3-53 MOVES Speed Bins		
Speed Bin ID	Average Bin Speed	Speed Bin Range
1	2.5	speed < 2.5 mph
2	5	2.5 mph <= speed < 7.5 mph
3	10	7.5 mph <= speed < 12.5 mph
4	15	12.5 mph <= speed < 17.5 mph
5	20	17.5 mph <= speed < 22.5 mph
6	25	22.5 mph <= speed < 27.5 mph
7	30	27.5 mph <= speed < 32.5 mph
8	35	32.5 mph <= speed < 37.5 mph
9	40	37.5 mph <= speed < 42.5 mph
10	45	42.5 mph <= speed < 47.5 mph
11	50	47.5 mph <= speed < 52.5 mph
12	55	52.5 mph <= speed < 57.5 mph
13	60	57.5 mph <= speed < 62.5 mph
14	65	62.5 mph <= speed < 67.5 mph
15	70	67.5 mph <= speed < 72.5 mph
16	75+	72.5 <= speed

VMT Calculations – For 2018, annual VMT inputs were interpolated from the MAG Pinal County PM_{10} domain TransCAD vehicle activity data for the 2015 and 2025 years. The first step in adapting the TransCAD data was the mapping of vehicle types between the TransCAD model and HPMS vehicle types. Table 3-54 shows an overview of the broad categories that exist in HPMS and TransCAD to describe vehicle classes.

Table 3-54 Overview of HPMS and TransCAD mapping			
HPMS Vehicle Type	FHWA Description*	MAG TransCAD Vehicle Class	MAG TransCAD Vehicle Class Description
10	Motorcycles	LOV + HOV + LGT	Single occupancy passenger cars (and trucks) including motorcycles
20	Passenger Cars		2+ occupancy passenger cars (and trucks)
30	Other Two-Axle, Four-Tire Single-Unit Vehicles		Light duty commercial – vehicle weight 0~8,000 lbs
50	Two-Axle, Six-Tire Single-Unit Trucks	MED	Medium duty commercial – FHWA vehicle classes 5 through 7
	Three-Axle, Six-Tire Single-Unit Trucks		
	Four or More Axle Single-Unit Trucks		
40	Buses	HVY	Heavy duty commercial – FHWA vehicle classes 4 and 8 through 13
60	Four or Fewer Axle Single-Trailer Trucks		
	Five-Axle Single-Trailer Trucks		
	Six or More Axle Single-Trailer Trucks		
	Five or Fewer Axle Multi-Trailer Trucks		
	Six-Axle Multi-Trailer Trucks		
	Seven or More Axle Multi-Trailer Trucks		

Source: Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity, Transportation and Regional Programs Division Office of Transportation and Air Quality U.S. Environmental Protection Agency, EPA-420-B-09-042 December 2009, page 26, Table 3.6.

Conversion factors were supplied by MAG for all HPMS vehicle types over all road types for the years 2011, 2015, and 2020. The conversion factors for 2018 were interpolated from the 2015 and 2020 results. Tables 3-55, 3-56, and 3-57 show the conversion factors used for HPMS 10, 20, 30, 40, and 60. HPMS 50 and the MED vehicle class are equivalent between the two vehicle categorization systems, so no conversion factor was required.

Total VMT was summed from the TransCAD outputs by the TransCAD vehicle types and road types before being converted over to the HPMS vehicle types using the conversion factors in Tables 3-55 to 3-57. Table 3-58 summarizes the vehicle activity within the PM_{10} nonattainment area as a whole. Each of the vehicle types was interpolated separately to 2018 and then summed for the total VMT. HPMS vehicle types were converted from the MAG vehicle types shown in Table 3-54.

Table 3-55
HPMS to TransCAD Motorcycle Conversion Factors

RoadTypeID	HPMS Vehicle Type	Split Factor to HOV+LOV			
		2011	2015	2018	2020
2	10	0.79%	0.77%	0.74%	0.72%
3	10	0.69%	0.66%	0.64%	0.63%
4	10	0.67%	0.65%	0.63%	0.61%
5	10	0.56%	0.54%	0.52%	0.51%

Table 3-56
HPMS to TransCAD Light-Duty Conversion Factors

RoadTypeID	HPMS Vehicle Type	Split Factor to (HOV+LOV-MC)+LGT			
		2011	2015	2018	2020
2	20	58.44%	59.14%	61.12%	62.44%
	30	41.56%	40.86%	38.88%	37.56%
3	20	57.43%	58.13%	60.13%	61.46%
	30	42.57%	41.87%	39.87%	38.54%
4	20	59.54%	60.23%	62.19%	63.50%
	30	40.46%	39.77%	37.81%	36.50%
5	20	59.43%	60.12%	62.08%	63.39%
	30	40.57%	39.88%	37.92%	36.61%

Table 3-57 HPMS to TransCAD Heavy-Duty Conversion Factors					
RoadTypeID	HPMS Vehicle Type	Split Factor to HVY			
		2011	2015	2018	2020
2	40	1.99%	2.12%	2.20%	2.25%
	60	98.01%	97.88%	97.80%	97.75%
3	40	7.84%	8.34%	8.62%	8.80%
	60	92.16%	91.66%	91.38%	91.20%
4	40	3.35%	3.57%	3.70%	3.78%
	60	96.65%	96.43%	96.30%	96.22%
5	40	7.02%	7.46%	7.71%	7.88%
	60	92.98%	92.54%	92.29%	92.12%

Table 3-58 2018 VMT Input Calculations for MOVES for Pinal County PM_{10} Nonattainment Area		
HPMSVtypeID	Description	2018
10	Motorcycle	17,106,599
25	2-axle, 4-tire Vehicles	1,743,985,259
40	Buses	11,329,808
50	Single Unit Trucks	97,188,423
60	Combination Trucks	193,356,385
Total		2,062,966,472

The average daily VMT totals in the PM_{10} nonattainment area for 2008 were calculated to be 4,036,832 miles based on the MAG TransCAD model outputs. The 2018 projections from MAG give 5,651,963 miles, for a daily average total increase of 40.0%.

Hourly Fractions – Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data recorded by continuous traffic counters on freeways (ADOT Freeway Management System) and arterials (Phoenix Automatic Traffic Recorders) during the year 2007.Table 3-59 gives the annual weekend and weekday hourly fractions for freeways and arterials inside Area A and is presented as a sample dataset. Design day and annual, outside Area A, specific values were developed separately. The final MOVES inputs apply the freeway fractions to the rural and urban restricted access road types (2 & 4) with the arterial fractions applied to the rural and urban unrestricted access road types (3 & 5). Weekend fractions are applied to the MOVES dayID 2 (weekend day tag) while the weekday fractions are applied to MOVES dayID 5 (weekday day tag). The hourly VMT fractions were held static across source types.
Road Type Distribution – The VMT by vehicle, area, and facility types from MAG's 2018 TRANSCAD traffic assignment for non-centroid roads was translated into road VMT fractions for each vehicle source type using a mapping table derived by MOVES2014

default VMT fraction for 2018. Road type distribution was developed separately for those roadways located within the Area A boundary and those located outside of the Area A boundary.

Table 3-60 shows the final distributions of road types on a VMT basis.

Table 3-59
2018 Inside Area A Hourly VMT Fractions by Road Type and Day

HourID	Freeway VMT Fractions		Arterial VMT Fractions	
	Weekend	Weekday	Weekend	Weekday
1	0.0213	0.0093	0.0213	0.0061
2	0.0151	0.0066	0.0151	0.0040
3	0.0135	0.0063	0.0135	0.0034
4	0.0103	0.0086	0.0103	0.0040
5	0.0124	0.0236	0.0124	0.0096
6	0.0199	0.0478	0.0199	0.0257
7	0.0281	0.0592	0.0281	0.0489
8	0.0349	0.0605	0.0349	0.0700
9	0.0414	0.0582	0.0414	0.0633
10	0.0493	0.0550	0.0493	0.0503
11	0.0558	0.0516	0.0558	0.0498
12	0.0598	0.0533	0.0598	0.0550
13	0.0640	0.0555	0.0640	0.0584
14	0.0646	0.0593	0.0646	0.0580
15	0.0637	0.0644	0.0637	0.0640
16	0.0634	0.0636	0.0634	0.0730
17	0.0638	0.0605	0.0638	0.0785
18	0.0627	0.0581	0.0627	0.0812
19	0.0592	0.0527	0.0592	0.0639
20	0.0508	0.0406	0.0508	0.0430
21	0.0445	0.0334	0.0445	0.0338
22	0.0410	0.0308	0.0410	0.0275
23	0.0354	0.0244	0.0354	0.0179
24	0.0254	0.0164	0.0254	0.0107

Table 3-60 Road Type 2018 VMT Distribution Interpolation			
sourceTypeID	roadTypeID	Outside Area A	Inside Area A
11	1	0.000	0.000
11	2	0.124	0.000
11	3	0.509	0.565
11	4	0.024	0.000
11	5	0.343	0.435
21	1	0.000	0.000
21	2	0.155	0.000
21	3	0.429	0.490
21	4	0.045	0.000
21	5	0.371	0.510
31	1	0.000	0.000
31	2	0.149	0.000
31	3	0.477	0.543
31	4	0.039	0.000
31	5	0.334	0.457
32	1	0.000	0.000
32	2	0.149	0.000
32	3	0.477	0.543
32	4	0.039	0.000
32	5	0.334	0.457
41	1	0.000	0.000
41	2	0.644	0.000
41	3	0.120	0.416
41	4	0.158	0.000
41	5	0.077	0.584
42	1	0.000	0.000
42	2	0.644	0.000
42	3	0.120	0.416
42	4	0.158	0.000
42	5	0.077	0.584
43	1	0.000	0.000
43	2	0.644	0.000
43	3	0.120	0.416
43	4	0.158	0.000
43	5	0.077	0.584

Table 3-60 Road Type 2018 VMT Distribution Interpolation			
sourceTypeID	roadTypeID	Outside Area A	Inside Area A
51	1	0.000	0.000
51	2	0.451	0.000
51	3	0.298	0.528
51	4	0.092	0.000
51	5	0.159	0.472
52	1	0.000	0.000
52	2	0.451	0.000
52	3	0.298	0.528
52	4	0.092	0.000
52	5	0.159	0.472
53	1	0.000	0.000
53	2	0.451	0.000
53	3	0.298	0.528
53	4	0.092	0.000
53	5	0.159	0.472
54	1	0.000	0.000
54	2	0.451	0.000
54	3	0.298	0.528
54	4	0.092	0.000
54	5	0.159	0.472
61	1	0.000	0.000
61	2	0.766	0.000
61	3	0.078	0.519
61	4	0.123	0.000
61	5	0.033	0.481
62	1	0.000	0.000
62	2	0.766	0.000
62	3	0.078	0.519
62	4	0.123	0.000
62	5	0.033	0.481

Source Type Population – Based on ADOT's 2008 vehicle registration information for Pinal County broken down by source type, the 2018 source type population for Pinal County was scaled up from the 2008 source type population with MAG's population projections. The 2018 source type populations for the union of the four non-centroid area were scaled using ratios derived by population data covered by each non-centroid area and Pinal County in 2018. The 2018 population data were provided by the MAG GIS group. Note that no single unit or combination long-haul trucks were included, because they are assumed to operate on interstate highways.

Source Type Age Distribution – Vehicle age distributions were held constant at 2008 levels for the 2018 projections.

Meteorology – 2008 meteorology inputs were held constant for the 2018 projections.[96]

Hourly and Daily VMT Fractions – These inputs were held at the 2008 levels based on the MAG travel activity data as there was no basis for projecting these to 2018 levels.

Table 3-61
Vehicle Population for the Pinal County PM_{10} Nonattainment Area 2018

yearID	sourceTypeID	Source Description	sourceTypePopulation
2018	11	Motorcycle	8,144
2018	21	Passenger Car	151,348
2018	31	Passenger Truck	44,203
2018	32	Light Commercial Truck	15,778
2018	41	Intercity Bus	17
2018	42	Transit Bus	51
2018	43	School Bus	809
2018	51	Refuse Truck	27
2018	52	Single Unit Short-haul Truck	940
2018	53	Single Unit Long-haul Truck	71
2018	54	Motor Home	79
2018	61	Combination Short-haul Truck	425
2018	62	Combination Long-haul Truck	320
TOTAL	All source types		222,213

[96] These data were downloaded from *ftp://ftp.ncdc.noaa.gov/pub/data/noaa/2008/* on July 3, 2013.

Monthly VMT Fractions – MAG provided arterial and freeway VMT fractions by hour, day, and month. MOVES expects a single composite VMT fraction that is not road-type specific. Using the TransCAD model outputs for activity, the freeway and arterial fractions were combined using a VMT-weighted average to create a composite VMT fraction by source type. The 2018 VMT data were created by linearly interpolating the 2015 and 2025 TransCAD outputs to 2018 levels; the results are displayed in Table 3-62. Monthly VMT fractions did not change between source types.

Fuel Supply – MOVES 2014 default values were used for this input field.

Fuel Formulation – MOVES 2014 default values were used for this input field.

I/M Programs – MOVES 2014 default values were used for this input field.

AVFT – Alternate vehicle fuel technology inputs utilized MOVES2014 default values, except where transit bus data were updated with the local year 2010 information provided by the Valley Metro.

Ramp Fractions – No ramp fractions calculations were applied, because there was no ramp road types within the modeling domains.

Table 3-62
Monthly VMT Fractions for 2018

isLeapYear	monthID	monthVMTFraction
N	1	0.08318
N	2	0.08587
N	3	0.08615
N	4	0.08578
N	5	0.08423
N	6	0.08249
N	7	0.07881
N	8	0.08070
N	9	0.08218
N	10	0.08340
N	11	0.08398
N	12	0.08323

Emissions Calculations – The calculation of emissions due to exhaust, brake, tire, fugitive dust, and bow wake from paved road vehicle activity is explained in the following sections.

Onroad Exhaust, Brake, and Tire – The use of MOVES lookup tables follows the same methodology as used for the 2008 emissions modeling. The conversion of the vehicle categories does differ between the 2008 and 2018 projections. Both the MOVES lookup tables and the TransCAD vehicle activity data are translated to HPMS vehicle types in order to calculate the exhaust emissions. Lookup tables from MOVES were translated by the mapping shown in Table 3-63. Composite HPMS vehicle type emission rates are calculated based on the source population weighted average of the MOVES-based vehicle source types. Emission rates for HPMS types 10 and 20 do not require a conversion factor from MOVES and were used as is.

The emission rates for each HPMS vehicle category were then organized into a look-up table by hour, speed bin, and road type. The emission rates are given for PM_{10} summed over exhaust, brake, and tire in grams per mile for the HPMS vehicle groups. The emission rate for each vehicle group is then chosen based on the hour group, speed bin and road type, and multiplied by the VMT for that vehicle group. The total exhaust, brake, and tire PM_{10} is then summed across the six vehicle groups according to the equation shown below. Note that ER in the equation below stands for the emission rate of a given vehicle group. The subscripts on VMT and ER represent the HPMS vehicle type.

$$PM_{10} = VMT_{10}*ER_{10} + VMT_{20}*ER_{20} + VMT_{30}*ER_{30} + VMT_{40}*ER_{40} + VMT_{50}*ER_{50} + VMT_{60}*ER_{60}$$

Table 3-63
HPMS MOVES Source Type Mapping Overview

HPMS Vehicle Type	sourceTypeID	sourceTypeName
10	11	Motorcycle
20	21	Passenger Car
30	31	Passenger Truck
	32	Light Commercial Truck
40	41	Intercity Bus
	42	Transit Bus
	43	School Bus
50	51	Refuse Truck
	52	Single Unit Short-haul Truck
	53	Single Unit Long-haul Truck
	54	Motor Home
60	61	Combination Short-haul Truck
	62	Combination Long-haul Truck

Fugitive Dust – The methodology applied in 2008 calculations was also used for 2018 with the exception that VMT and travel flow were based on the travel model outputs from 2015 and 2025 interpolated to 2018.

Bow Wake Emissions – The methodology applied in 2008 calculations was also used for 2018 with the exception that the values for VMT, flow, and speed were based on interpolating travel model results from 2015 and 2025 to 2018. Unpaved shoulders were tagged based on spatial overlapping of links between the TransCAD and AZTDM in ArcGIS.

Summary – Projections for the 2018 emissions inventory were based on interpolation between TransCAD travel modeling projections produced by MAG for the 2015 and 2025 years. The shift in source data for the projected years required new conversion methodologies for the vehicle activity outputs in order to generate MOVES inputs and to calculate emissions based on MOVES lookup tables.

Total PM_{10} emissions were summed across the exhaust, brake, tire, fugitive dust, and bow wake subtotals for a given link in a given hour group. Since the dispersion model requires an input of hourly emissions for the links, the PM_{10} emissions for an hour group are distributed to individual hours based on hourly VMT fractions. Table 3-59 above shows an example of the hour group fractions used to allocate from each hour group to an individual hour. These tables were created for each modeling domain/design day. The emissions can then be pulled modeling domain specific links to be used as inputs for the dispersion modeling.

<u>Unpaved Road Fugitive Dust</u> – Except for the unpaved public and private roads, the methods and travel activity employed in the 2008 calculation for the unpaved road emissions (unpaved Ag road, unpaved trails, and test tracks) were held constant for 2018.

Unpaved public and private road ADT was estimated based on road classification by PCAQCD for the year 2013 (Exhibit 1). ADEQ backcast public and private road ADT from 2013 to 2008 based on ADOT supplied HPMS data (which showed a 4.17% increase in VMT over the 5-year span). In the absence of more accurate data, ADEQ relied upon ADOA population projection data as a surrogate for traffic growth between 2013 and 2018. ADOA low-population growth series data estimates that population will increase by 12.14% between 2013 and 2018[97]. Given these surrogates combined, ADEQ estimated an ADT increase on public and private unpaved roads of 16.82% between 2008 and 2018.

In addition to ADT increases on public unpaved roads numerous improvement projects were completed between 2008 and the end of 2018 that were determined to reduce road dust reentrainment. Based on the information provided by local public works departments

[97] ADOA projects county populations using 3 different sets of assumptions. ADEQ used projections from the Low-Series, because these have been most closely correlated with actual population growth in the county from 2012-2014; however, the Low-Series still overestimated growth during this period, providing a conservative metric for projection of activity. ADOA estimated 2008 countywide population as 358,190 (https://population.az.gov/population-estimates). ADOA Low-Series projections, projected 2013 and 2018 countywide population as 394,066 and 441,890, respectively (https://population.az.gov/population-projections).

and regional planning organizations, these projects were digitized and the locations reviewed to determine whether they fell within the design day modeling domains. Table 3-64 provides a brief description of each project, the length of the roadway treated, and the modeling domain in which it was located. Additional projects occurred within the nonattainment area but are located outside of modeling domains, these projects were not included in Table 3-64.

Estimates of the control efficiency of these projects were based on the Maricopa Department of Transportation's PM_{10} cost-effectiveness control report[98] and are listed in Table 3-65.

Fugitive dust emissions from operations on unpaved roads at test track were calculated for 2018 using the methodology described in Section 3.1.1.4. Estimates of ADT, vehicle speed, and control efficiency are held constant from 2008 through 2018.

Table 3-64
Summary of the Controlled Unpaved Public Roads Located Within Modeling Domains
2008 – 2015

Project Location	Work Description	Length (mile)	Modeling Domain
Curry Road - SR 287 to Storey Road	Double Chip Sealing	1.3	PCH
Storey Road - Eleven Mile Corner to Curry Road	Double Chip Sealing	3.2	PCH
Tweedy Road - SR 287 to Storey Road	Double Chip Sealing	1.3	PCH
Bowlin Road - Hartman Rd to Murphy Rd	Pave Roadway	1	CWT
Barnes Rd & Fuqua Rd – White & Parker to Lealand Rd	Pave Roadway	2.5	STF
La Palma Rd – SR-287 to 0.25 miles north of Kleck Rd	Chip Sealing	2.25	PCH

[98] Cost-Effectiveness of Selected PM_{10} Control Measures, Prepared for Maricopa Department of Transportation, Sierra Research Inc., June 30, 2006

Table 3-65 Summary of the Control Efficiency for the Unpaved Roads		
Control Measure	Design Day	Annual
Single / Double Chipseal Once Per Year[1]	90%	90%
Paved Roadway	99%	99%
Paved Shoulders[2]	64%[99]	64%
Synthetic Dust Supressants[2]	73%	73%
Synthetic Dust Suppressant application to shoulders[2,3]	46%	46%

[1] In the absence of additional control efficiencies, ADEQ assumed a conservative 90% Control Efficiency for Chipsealing (as it is considered a form of paving, but requires more upkeep than traditional hot-mix asphalt).
[2] These controls were applied to projects within the nonattainment area, but not in modeling domains
[3] The control efficiency of synthetic dust suppressants on shoulders was calculated as the ratio of paved shoulder efficiency divided by paved road control efficiency multiplied by synthetic dust suppressant control efficiency on roads (i.e. 63.6% / 99.86% * 73% = 46%).

Nonroad Vehicles – Nonroad exhaust emissions from 2008 were grown to 2018 using countywide population growth as the surrogate for all sectors except agriculture. Agricultural nonroad emissions were kept constant from 2008 to 2018 to provide consistency with agricultural crop emission projection techniques. The rate of population growth between 2008 and 2018 was calculated from ADOA population projections for 2018 and the estimated population in 2008 as an increase of 23.4%. Overall PM totals for the Western Pinal County PM_{10} Nonattainment Area for both 2008 and 2018 are shown in Table 3-66. ADEQ recognizes that this is a conservative estimate of emissions from NONROAD vehicles as it does not take into account reductions in engine efficiencies and the implementation of new engine emission controls with fleet turnover between 2008 and 2018.

Table 3-66 2008 and 2018 NONROAD Emissions For Western Pinal County PM_{10} Nonattainment Area			
Calendar Year	PM_{10} (tpy)	PM_{10} (tpd)	Percent Change in Emissions
2008	121	0.33	19.1%
2018	144	0.40	

[99] Langston, R. *et al.* Alternative Technologies for Evaluating Paved-Road Dust Emission Potential – Mobile Sampling Methodology as an Alternative to Traditional AP-42 Silt Measurements. http://www.epa.gov/ttnchie1/conference/ei15/session14/langston.pdf

Trackout – The same methodology described in Section 3.1.1.6 was used to calculate emissions for 2018.

Railroads – EPA most recently summarized emissions factors for locomotives in a 2008 study.[100] The PM_{10} emission factor averaged over the line haul locomotive fleet in the US is projected to be 2.7 grams (vs. 5.1 grams in 2008) emitted per gallon of Diesel fuel consumed in 2018. PM_{10} emissions from each train passing the Cowtown monitor is 19.6 g/mi (vs. 37 g/mile in 2008). Other assumptions for calculating 2018 railroad emission, such as the railroad length and number of trains per hour, are held constant from 2008.

Construction – Described below are the steps used to develop factors projecting 2008 construction emissions to 2018 for the stagnation modeling domain.

- The county recorded the number of permits issued in the Pinal PM_{10} nonattainment area through 2013 (see Table 3-67 below). The ratio of the number of dust permits issued in 2008 and 2013 was used to develop a projection factor for 2013.

- The ratio of county population growth between 2013 and 2018 (also shown in the table below) was used to adjust the 2013 projection factor to 2018.

The following steps produced the factor used to adjust the 2008 construction emissions to 2018:

- Construction projection factor from 2008 to 2013: 363/633 = 0.573
- Construction projection factor from 2013 to 2018: 441890/394,066 = 1.12
- Overall construction projection factor from 2008 to 2018: 0.573*1.12 = 0.643

While road construction emissions were not calculated for 2008 due to incomplete data, ADEQ estimated road construction emissions for 2018 based on a list of planned road projects to be completed by 2018 compiled through consultation with County and local municipality public works departments and metropolitan planning organizations. These projects were digitized, with a permit type of "1". The road construction project list was truncated to only include those projects planned to occur during 2018. Projects were assigned emission factors based on project type.

- 0.42 tons PM_{10}/acre-month – Projects anticipated to involve significant earthmoving activities, including: new paved road construction, new lanes on paved roads, road reconstruction involving milling, or intersection improvements.
- 0.27 tons/acre-month – Projects anticipated to involve moderate earthmoving activities, including: chip sealing, non-milling road surfacing, and sidewalk construction.
- 0.0 tons PM_{10}/acre-month – Projects assumed to be minimally emissive or non-emissive, including: synthetic dust suppressant application or slurry seals.

[100] Emission Factors for Locomotives, EPA-420-F-09-025, U.S. Environmental Protection, April 2009

Table 3-67 Data used to Project Pinal PM_{10} Nonattainment Area Construction Activity from 2008 to 2018			
Year	Dust Permits Issued in Pinal PM_{10} Nonattainment Area	Year	Population in Pinal County
2008	**633**	2013	**394,066**
2009	444	2014	400,210
2010	360	2015	408,757
2011	287	2016	418,920
2012	364	2017	430,263
2013	**363**	2018	**441,890**

Residential, commercial, and site development projects were assumed to start and end on the same days of the month and month of the year for 2018 as was estimated using the approach discussed in Section 3.1.1.8 for the year 2008. Road construction projects were conservatively assumed to always occur on a design day of interest if it fell within the modeling domain.

Emission rates were adjusted to account for the 22.9% control effectiveness for construction sites due to the currently implemented Pinal County construction rule. As Pinal County's proposed general fugitive dust rule (PCAQCD Code of Regulations §4-1-010 to §4-1-060) is anticipated to increase the number of road construction projects, an average road construction emission rate of 0.226 tons/acre-month was calculated for the currently planned projects that would qualify for the rule. Theoretical, additional projects (calculated as 13.9 additional miles of road construction nonattainment area-wide) were assumed to undergo construction in 2018 in response to the proposed Fugitive Dust Rule and were assigned the calculated average emission rate of 0.226 tons/acre-month. To provide a conservative road construction emission assumption on design days, unplanned Fugitive Dust Rule road construction projects were assumed to occur on Class D and E roadways within each modeling domain. These projects were assumed to occur on the design day of interest.

Activity level for all road construction projects was determined based on assumptions from the WRAP Fugitive Dust Handbook, section 3.4.1.[101] Road construction project acreage was calculated by multiplying the road length by the project width. Project width was calculated as the sum of the width of lanes included in the work (12' per lane), the shoulders included (10' per shoulder), and additional spillover (25' per project). Where the number of lanes was not known for a planned project, it was assumed the project would incorporate 2 lanes and 2 shoulders. For theoretical fugitive dust rule projects, ADEQ assumed a project width of 73' (25' spillover and 48' wide road with shoulders).

[101] http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

Road project duration for project types was assumed equivalent to the values reported by Jiang and Wu[102]. For any projects not defined in the Jiang and Wu study, the project duration was assumed to conservatively occur for 1.03 months.

Given that projects were only temporally allocated to year, all road improvement projects taking place in 2018 were assumed to occur on the design day if the project was located within the design day domain. This was a conservative estimate. Total nonattainment area-wide emissions for theoretical fugitive dust rule projects were calculated and dispersed evenly throughout the nonattainment area on roads which experience >150 ADT traffic.

Permitted Sources – The emission estimates calculated for the 2008 inventory were held constant for 2018.

Dairy – The 2008 methodologies described in Section 3.1.1.10 were retained for 2018 calculations. Animal populations changed slightly nonattainment area wide from 71,624 to 70,644 between 2008 and 2018 according to information supplied by the United Dairymen of Arizona. In the Stanfield modeling domain a small dairy began operation between 2008 and 2018 with a reported animal population of 14 which resulted in slightly increased emissions within this modeling domain.

Combustion Sources – 2008 estimates described in Section 3.1.1.11 were held constant for 2018.

Unpaved Parking – 2008 estimates described in Section 3.1.1.12 were held constant for 2018.

Tribal –2008 estimates described in Section 3.1.1.13 were held constant for 2018.

3.2.2 High Wind Methodologies

As described in Section 3.1.2, high wind design days had separate inventories for low and high wind hours. During all hours of the day, activity related emission estimates used the methods and data described above; during high wind hours, windblown emission estimates for all of the source categories addressed in Section 3.1.2 were unchanged except for Construction. The revised methodology for the Construction category is described below.

CAFOs - Four facilities were closed after 2008: Pinal Feed East, Maricopa Cattle Co. East, Maricopa Cattle Co. West, and Owen Kelly Feed Yard. These facilities were assumed to convert from CAFO lands to Cleared Areas for the purposes of windblown dust calculation in 2018.

Construction – For the high wind modeling domain, the steps outlined below were used to project 2008 construction emissions to 2018.

[102] Jiang, Y.; Wu, H. Determination of INDOT Highway Construction Production Rates and Estimation of Contract Times. FHWA/IN/JTRP-2004/11.

- For the low wind hours during high wind days, the 2008 construction emissions were projected to 2018 using the projection factors described in Section 3.2.1.

- For the high wind hours, the 2008 windblown dust emissions were divided into two emission categories:

    1. Windblown Construction Emissions: the acreage of the 2008 construction area for the windblown dust emissions was adjusted using the projection factor described in Section 3.2.1.

    2. Developed Urban Land Emissions: the 2008 land no longer under development (i.e., where construction is assumed to have been completed) was assumed to be developed urban land (i.e., 1 – 0.643).

Emissions were calculated for the adjusted 2018 areas using the methodology described in Section 3.1.2.

Unpaved Roads - Numerous improvement projects were completed between 2008 and the end of 2018 that were determined to reduce windblown dust from unpaved roads. Based on the information provided by local public works departments and regional planning organizations, these projects were digitized and the locations reviewed to determine whether they fell within the high wind design day modeling domains. Table 3-68 provides the name of each roadway treated within a modeling domain, the length of the roadway treated, and the modeling domain in which it was located. Additional projects occurred within the nonattainment area but are located outside of modeling domains, these projects were not included in Table 3-68.

Estimates of windblown control efficiency of these projects are listed in Table 3-69.

Table 3-68
Summary of the Controlled Unpaved Roads Located Within Modeling Domains
2008 – 2018

Project Location	Work Description	Length (mile)	Modeling Domain
Farrell Rd	Double Chip Sealing	2.1	CWT
Whisker Rd	Double Chip Sealing	0.5	MAC
Storey Rd	Double Chip Sealing	0.6	PCH
Sunshine Blvd	Shoulder Stabilization	0.4	PCH
La Palma Rd	Chip Sealing	0.84	PCH

Table 3-69 Summary of the Control Efficiency for the Unpaved Roads		
Control Measure	Design Day	Annual
Single / Double Chipseal Once Per Year[1]	99.86%	99.86%
Shoulder Stabilization[2]	38%	38%

[1] ADEQ assumed utilized the same control efficiency for chipsealing as for hot-asphalt paving as both treatments are recognized as paving methods and both provide an impermeable surface for road bed dust entrainment.

[2] Stabilized shoulders are assumed to have shoulders that will emit at the stabilized emission rate or 84.2% lower than disturbed. Shoulders are assumed to be 10 ft wide and lanes are assumed to be 12 ft wide. Therefore the total CE = ((2*10)/((X*12)+(2*10))*.842. Where X = # of lanes (for the efficiency supplied above, the road is assumed to have 2 lanes).

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4. EMISSION SUMMARY

4.1 2008 Estimated Emissions

The methods and activity levels described in Section 3 were applied to the modeling domains and land uses detailed in Section 2 to estimate emissions for each parcel under stagnation/low wind and high wind conditions. A summary of the hourly emission estimates in units of lbs/hour for each source category is presented in Tables 4-1 through 4-3 for Cowtown, Stanfield, and Pinal County Housing stagnation design days and Tables 4-4 through 4-7 for the high wind Pinal County Housing, Cowtown, Maricopa, and Stanfield monitors. Pie chart comparisons of the source distribution for each modeling domain are presented in Figure 4-1 for stagnation days and Figure 4-2 for high wind days.

To provide perspective on hourly changes by source, information on hourly wind speed (WSPD) in miles/hour, wind direction (WD) in degrees, and PM_{10} observations (µg/m3) is also provided. To gain insight into source apportionment, average daily emission estimates are presented along with their percentage contribution to the overall level of PM_{10} emitted. Air quality modeling—which combines information on emissions, location, and meteorology—will provide more detail on each source's contribution to concentrations recorded on the selected design days.

To aid review of the high wind day estimates, the high wind hours (WSPD $\geq$ 12 mph) are shaded to distinguish them from low wind hours. Estimates in the high wind tables show that loose particles entrained during high wind hours are substantially greater than those produced by mechanical activities and combustion during low wind hours.

Trackout for paved roads is included with the paved road estimates to simplify the summaries.

Table 4-1
10/30/2008 Cowtown (CWT) Stagnation Day Modeling Domain Emission Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Rail Road	Permitted Sources	Paved Road	Construction	CAFOs	Fires	Open Burning	Residential Fuel	Nonroad	Unpaved Parking Lots	Non-tribal Agriculture	Tribal Agriculture	Vehicle Test Tracks	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Tribal Roads	Total
1	2.2	139.7	210.7	1.2	5.5	2.1	0.0	37.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0	12.9	3.8	0.0	5.0	68.6
2	2.9	140.2	296.4	1.2	5.5	1.4	0.0	37.1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.9	0.0	13.5	19.1	0.0	9.8	88.8
3	3.4	155.5	184.2	1.2	5.5	1.2	0.0	74.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.9	0.0	12.7	9.5	0.0	6.6	112.1
4	3.8	154.4	169.9	1.2	5.5	1.4	0.0	148.4	0.0	0.0	0.0	0.0	0	0.0	0.0	0.9	0.0	11	0	0.0	3.3	171.7
5	2	135.6	89.1	1.2	5.5	3.3	0.0	370.9	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.9	0.0	21.1	11.4	0.0	9.7	424.3
6	0.9	148.6	191.5	1.2	5.5	8.8	0.0	370.9	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.9	0.0	52.2	40	0.0	27.6	508.0
7	2.9	158.3	265.2	1.2	5.5	14.7	0.0	370.9	0.5	0.1	0.0	1.1	7.3	19.3	11.2	0.9	316.5	117.9	80	3.5	154.0	1104.6
8	2.9	58.8	421.2	1.2	5.5	21.0	257.9	370.9	0.5	0.1	0.0	1.1	6.9	19.3	11.2	85.3	316.5	167.9	49.6	3.5	159.8	1478.2
9	2.5	33.7	239.1	1.2	5.5	18.9	257.9	370.9	0.5	0.1	0.0	1.1	7.1	19.3	11.2	85.3	316.5	145.8	66.7	3.5	158.4	1469.8
10	0.9	98.6	120.2	1.2	5.5	14.0	257.9	370.9	0.5	0.1	0.0	1.1	8.1	19.3	11.2	85.3	316.5	166.1	125.8	3.5	182.1	1569.1
11	1.6	112.3	88.7	1.2	117.2	13.9	257.9	296.7	0.5	0.1	0.0	1.1	7.4	19.3	11.2	85.3	316.5	145.9	83.9	3.5	163.5	1525.0
12	2.5	83.4	25.9	1.2	117.2	15.3	257.9	296.7	0.5	0.1	0.0	1.1	8.2	19.3	11.2	85.3	316.5	175.5	129.6	3.5	186.1	1625.1
13	2.7	325.6	86.2	1.2	5.5	16.3	257.9	222.5	0.5	0.1	0.0	1.1	7.6	19.3	11.2	85.3	316.5	154.4	93.4	3.5	168.9	1365.2
14	4	320.7	63.8	1.2	107.9	16.2	257.9	222.5	0.5	0.1	0.0	1.1	8.5	19.3	11.2	85.3	316.5	176.4	148.7	3.5	192.1	1568.7
15	3.1	335.4	30.8	1.2	107.9	17.8	257.9	222.5	0.5	0.1	0.0	1.1	8.1	19.3	11.2	85.3	316.5	195.7	118.2	3.5	188.7	1555.4
16	2.5	325.9	49.8	1.2	5.5	28.7	257.9	296.7	0.5	0.1	0.0	1.1	8.2	19.3	11.2	85.3	316.5	209.7	125.8	3.5	195.2	1566.4
17	1.8	326.7	78.5	1.2	5.5	30.9	257.9	370.9	0.5	0.1	0.0	1.1	7.6	19.3	11.2	85.3	316.5	188.3	91.5	3.5	178.5	1569.8
18	3.4	290.4	298.2	1.2	5.5	31.9	0.0	519.2	0.5	0.1	0.0	1.1	7.3	19.3	11.2	85.3	316.5	169.7	76.2	3.5	168.4	1416.9
19	1.1	252.5	1342.7	1.2	5.5	21.9	0.0	667.6	0.0	0.0	0.0	0.0	1.5	0.0	0.0	85.3	0.0	95.1	80	0.0	52.4	1010.5
20	1.8	249.1	286.5	1.2	5.5	14.8	0.0	667.6	0.0	0.0	0.0	0.0	1.1	0.0	0.0	85.3	0.0	54.4	61	0.0	34.5	925.4
21	2.7	129.3	451.9	1.2	5.5	11.6	0.0	519.2	0.0	0.0	0.0	0.0	1.2	0.0	0.0	85.3	0.0	56.9	68.6	0.0	37.6	787.1
22	1.6	170.2	264.7	1.2	5.5	9.4	0.0	370.9	0.0	0.0	0.0	0.0	0.4	0.0	0.0	85.3	0.0	48.3	19.1	0.0	20.2	560.3
23	3.4	164.1	282.8	1.2	5.5	6.2	0.0	111.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	85.3	0.0	33.1	17.2	0.0	15.0	275.1
24	4	148.8	329.8	1.2	5.5	3.7	0.0	111.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0	21.7	5.7	0.0	8.2	158.3
Average			244.5	1.2	23.4	13.6	107.5	309.1	0.2	0.1	0.0	0.6	4.1	9.7	5.6	57.2	158.2	101.9	63.5	1.7	96.9	954.3
Percentage Contribution				0.1%	2.4%	1.4%	11.3%	32.4%	0.0%	0.0%	0.0%	0.1%	0.4%	1.0%	0.6%	6.0%	16.6%	10.7%	6.7%	0.2%	10.2%	100.0%

Table 4-2
10/29/2008 Stanfield (STF) Stagnation Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Roads	Permitted Sources	Fires	Open Burning	Residential Fuel Combustion	Dairies	Construction	CAFOs	Nonroad	Agriculture	Unpaved Parking Lots	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	2.1	251.9	46	0.6	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	15.9	3.0	0.0	30.4
2	2.3	159.9	79	0.4	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	0.1	0.0	22.2	15.0	0.0	48.6
3	3.5	139.5	76.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	21.7	0.0	0.0	0.0	0.0	14.2	7.5	0.0	43.8
4	2.8	155.2	63	0.4	0.0	0.0	0.0	0.0	0.0	0.0	43.4	0.0	0.0	0.0	0.0	15.3	0.0	0.0	59.1
5	2.8	99.4	144	0.9	0.0	0.0	0.0	0.0	0.0	0.0	108.6	0.0	0.0	0.1	0.0	31.8	9.0	0.0	150.4
6	1.9	108	183.5	2.4	0.6	0.0	0.0	0.0	0.0	0.0	108.6	0.0	0.0	0.2	0.0	63.3	31.6	0.0	206.7
7	1.8	179.6	187.7	4.8	0.6	0.6	0.0	0.0	9.4	0.0	108.6	0.2	73.3	3.5	635.7	153.6	63.2	3.2	1056.6
8	1.8	171.9	307.2	6.9	0.6	0.6	0.0	0.0	9.4	2.1	108.6	0.2	73.3	3.4	635.7	216.9	39.1	3.2	1099.9
9	1.5	183.8	226	6.2	0.6	0.6	0.0	0.0	9.4	2.1	108.6	0.2	73.3	3.5	635.7	204.4	52.7	3.2	1100.4
10	3.6	82.4	133.2	3.9	0.6	0.6	0.0	0.0	9.4	2.1	108.6	0.2	73.3	3.7	635.7	214.1	99.3	3.2	1154.7
11	3.2	121.4	126.2	3.9	0.6	0.6	0.0	0.0	9.4	2.1	86.9	0.2	73.3	3.5	635.7	199.2	66.2	3.2	1084.8
12	2.9	129.8	116.1	4.3	0.6	0.6	0.0	0.0	9.4	2.1	86.9	0.2	73.3	3.7	635.7	228.1	102.3	3.2	1150.4
13	3	165.8	101.7	4.6	0.6	0.6	0.0	0.0	9.4	2.1	65.2	0.2	73.3	3.6	635.7	204.2	73.7	3.2	1076.3
14	2	112.1	69.7	4.5	0.6	0.6	0.0	0.0	9.4	2.1	65.2	0.2	73.3	3.8	635.7	227.8	117.4	3.2	1143.8
15	2.2	67.2	65.5	5.0	0.6	0.6	0.0	0.0	9.4	2.1	65.2	0.2	73.3	3.7	635.7	253.0	93.3	3.2	1145.2
16	2.4	94.3	43.8	8.0	0.6	0.6	0.0	0.0	9.4	2.1	86.9	0.2	73.3	3.7	635.7	272.0	99.3	3.2	1195.0
17	2.8	59.4	43.8	8.6	0.6	0.6	0.0	0.0	9.4	2.1	108.6	0.2	73.3	3.6	635.7	269.9	72.2	3.2	1188.0
18	2.6	5.3	509.1	8.9	0.0	0.6	0.0	0.0	9.4	0.0	152	0.2	73.3	3.5	635.7	234.1	60.2	3.2	1181.1
19	2.5	297.8	341.7	6.1	0.0	0.0	0.0	0.0	9.4	0.0	195.5	0.0	0.0	0.4	0.0	133.7	63.2	0.0	408.3
20	1.8	296.4	628.5	4.1	0.0	0.0	0.0	0.0	9.4	0.0	195.5	0.0	0.0	0.3	0.0	81.2	48.1	0.0	338.6
21	2.9	260.5	124.8	3.2	0.0	0.0	0.0	0.0	9.4	0.0	152	0.0	0.0	0.3	0.0	87.5	54.2	0.0	306.7
22	2.2	253.8	72.7	2.6	0.0	0.0	0.0	0.0	0.0	0.0	108.6	0.0	0.0	0.1	0.0	69.9	15.0	0.0	196.2
23	2.9	169.3	93.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	32.6	0.0	0.0	0.1	0.0	45.2	13.5	0.0	93.1
24	3.5	163.9	106.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	32.6	0.0	0.0	0.0	0.0	31.2	4.5	0.0	69.4
Average			162.1	3.9	0.3	0.3	0.0	0.0	5.9	0.9	90.5	0.1	36.7	1.9	317.8	137.0	50.1	1.6	647.0
Percentage Contribution				0.6%	0.0%	0.0%	0.0%	0.0%	0.9%	0.1%	14.0%	0.0%	5.7%	0.3%	49.1%	21.2%	7.8%	0.2%	100.0%

Table 4-3
10/29/2008 Pinal County Housing (PCH) Stagnation Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Road	Fires	Open Burning	Residential Fuel	Permitted Sources	Construction	Dairies	Nonroad	Agriculture	Unpaved Parking Lots	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	2.1	100.2	91.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	8.2	1.8	0.0	10.6
2	1.3	122.1	86.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	10.3	9.0	0.0	19.9
3	1.1	73.5	72.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	7.2	4.5	0.0	12.1
4	1.1	144	67.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0	8.5
5	1.1	246	76.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	18.3	5.4	0.0	24.8
6	1.1	142.8	60.1	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	35.5	18.8	0.0	57.4
7	1.1	189.5	145.8	4.0	0.2	0.0	0.0	0.0	0.0	1.7	0.1	31.6	4.1	153.1	79.5	37.6	1.6	313.5
8	1.1	276	287	5.8	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.0	153.1	115.0	23.3	1.6	339.3
9	1.6	133.5	179.2	5.2	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.2	153.1	110.7	31.3	1.6	342.6
10	1.1	300.9	455.2	4.3	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.7	153.1	116.8	59.1	1.6	376.1
11	1.4	18.9	234.8	4.3	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.3	153.1	109.8	39.4	1.6	348.9
12	1.6	259.9	85.6	4.7	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.7	153.1	124.4	60.9	1.6	386.0
13	1.4	308.7	71.4	5.0	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.4	153.1	110.3	43.9	1.6	354.8
14	2.6	263.9	62.7	5.0	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.9	153.1	121.5	69.8	1.6	392.3
15	2.2	292.9	65.6	5.5	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.7	153.1	133.4	55.5	1.6	390.3
16	1.5	244	54.5	6.9	0.2	0.0	0.0	2.7	0.3	1.7	0.1	31.6	4.8	153.1	139.6	59.1	1.6	401.5
17	1.5	294	40.8	7.4	0.2	0.0	0.0	0.0	0.3	1.7	0.1	31.6	4.5	153.1	139.4	43.0	1.6	382.8
18	1.1	300.1	368.4	7.7	0.2	0.0	0.0	0.0	0.0	1.7	0.1	31.6	4.3	153.1	119.1	35.8	1.6	355.1
19	1.1	53	588.4	6.5	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.9	0.0	67.2	37.6	0.0	113.8
20	1.1	57.4	453.5	4.3	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.7	0.0	39.9	28.6	0.0	75.2
21	1.1	91.7	281.6	3.4	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.7	0.0	42.8	32.2	0.0	80.9
22	1.1	82.1	199.3	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	33.6	9.0	0.0	45.7
23	1.1	128.4	128.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	21.8	8.1	0.0	31.9
24	1.1	187.8	114.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	16.4	2.7	0.0	20.2
Average			178.0	3.8	0.1	0.0	0.0	1.0	0.1	1.1	0.1	15.8	2.4	76.6	72.0	29.8	0.8	203.5
Percentage Contribution				1.9%	0.0%	0.0%	0.0%	0.5%	0.1%	0.5%	0.0%	7.8%	1.2%	37.6%	35.4%	14.7%	0.4%	100.0%

Figure 4-1
Stagnation Design Day Source Contributions – 2008

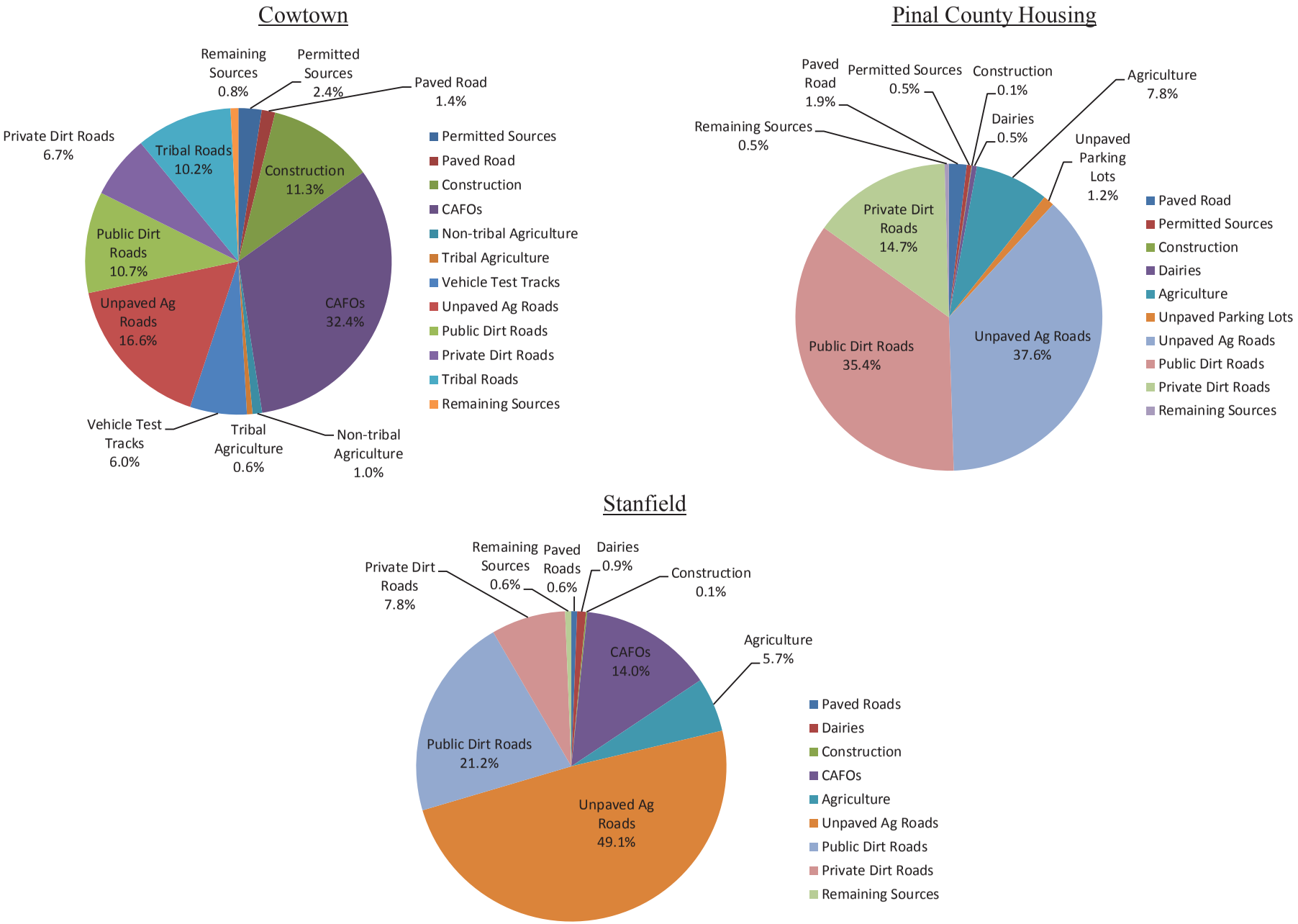


Table 4-4
1/1/2008 Pinal County Housing (PCH) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Roads	Permitted Sources	Fires	Open Burning	Residential Fuel	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban	Nonroad	Agriculture	Unpaved Parking	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	1.6	303.8	28.2	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	13.4	3.1	0.0	17.1
2	1.5	318	21	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	12.2	15.6	0.0	28.5
3	1.9	335.4	22.2	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	12.6	7.8	0.0	20.9
4	2.5	333.7	24.5	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	12.4	0.0	0.0	12.8
5	5.9	352.2	16.4	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	29.0	9.4	0.0	39.4
6	3.1	299.6	19.1	1.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	63.0	32.8	0.0	98.2
7	3.9	339.3	16.2	3.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	80.0	7.5	283.7	126.7	65.6	4.2	571.3
8	5.7	5	22.7	4.5	2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	80.0	7.4	283.7	187.5	40.6	4.2	611.1
9	4.8	53.9	34.7	4.0	2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	80.0	7.5	283.7	174.1	54.7	4.2	611.5
10	16.2	41.2	871.2	2.4	2.7	0.3	0.0	0.0	44.2	131.9	36.1	4.1	0.3	916.3	8.3	344.2	211.7	126.7	11.9	1841.0
11	21.3	46.3	919.3	2.4	2.7	0.3	0.0	0.0	182.6	523.5	143.1	18.1	0.3	3754.5	7.8	551.9	248.7	173.2	38.5	5647.4
12	24.9	49.6	1136.1	2.6	2.7	0.3	0.0	0.0	601.8	1725.7	471.7	59.5	0.3	12193.5	8.4	1167.9	439.2	450.8	117.4	17241.9
13	23.4	48.5	790.7	2.8	2.7	0.3	0.0	0.0	248.6	712.9	194.9	24.6	0.3	5084.3	7.9	649.0	276.0	218.9	50.9	7474.0
14	22.8	48.3	946.1	2.7	2.7	0.3	0.0	0.0	132.0	378.6	103.5	13.1	0.3	2737.5	8.6	477.7	250.5	197.4	29.0	4333.9
15	19.1	47.6	320	3.0	2.7	0.3	0.0	0.0	64.5	192.6	52.6	5.9	0.3	1300.6	8.3	371.9	240.1	131.2	15.5	2389.5
16	22.1	53.6	397.9	5.3	2.7	0.3	0.0	0.0	123.5	354.2	96.8	12.2	0.3	2566.0	8.4	465.2	268.7	173.8	27.4	4104.9
17	19.8	53.6	281.9	5.7	0.0	0.3	0.0	0.0	71.9	214.8	58.7	6.6	0.3	1441.4	7.9	382.1	232.9	113.4	16.8	2552.9
18	15	50.6	65.8	5.9	0.0	0.3	0.0	0.0	19.8	61.6	16.8	1.7	0.3	430.8	7.6	308.8	185.6	72.3	7.4	1118.8
19	15.5	54.6	50.9	3.7	0.0	0.0	0.0	0.1	11.1	33.2	9.1	1.0	0.0	210.7	1.4	15.2	102.5	71.5	2.0	461.6
20	19.2	58.1	61.5	2.5	0.0	0.0	0.0	0.1	27.3	81.5	22.3	2.5	0.0	516.4	0.9	37.3	64.6	64.5	4.8	824.7
21	19.2	56.7	70.6	2.0	0.0	0.0	0.0	0.1	24.8	74.1	20.2	2.3	0.0	469.5	1.0	33.9	66.2	69.4	4.3	767.9
22	19	57.4	67.6	1.6	0.0	0.0	0.0	0.1	19.8	59.3	16.2	1.8	0.0	375.6	0.4	27.1	53.2	26.2	3.5	584.8
23	17.1	55.7	32.7	1.1	0.0	0.0	0.0	0.1	9.4	28.2	7.7	0.9	0.0	178.4	0.3	12.9	34.8	19.1	1.7	294.6
24	14.8	54.6	139.3	0.6	0.0	0.0	0.0	0.1	9.1	28.4	7.8	0.8	0.0	161.9	0.2	11.6	27.6	9.2	1.5	258.8
Average			264.9	2.5	1.0	0.1	0.0	0.1	66.3	191.7	52.4	6.5	0.2	1357.4	4.2	237.8	138.9	89.5	14.4	2162.8
Percentage Contribution				0.1%	0.0%	0.0%	0.0%	0.0%	3.1%	8.9%	2.4%	0.3%	0.0%	62.8%	0.2%	11.0%	6.4%	4.1%	0.7%	100.0%

Shaded Area = High Wind Hours

Table 4-5
4/27/2008 Cowtown (CWT) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Railroad	Permitted Sources	Paved Roads	Construction	Cleared Area	Non-tribal Desert Shrubland	Tribal Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Residential Fuel Combustion	Fires	Open Burning	Nonroad	CAFOs	Unpaved Parking Lots	Non-tribal Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Tribal Roads	Test Tracks	Total
1	6.0	332.4	68.3	1.2	5.5	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.1	0.1	4.3	3.1	0.0	15.7	3.6	0.0	6.7	6.7	89.5
2	0.7	320.5	73.0	1.2	5.5	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.1	0.4	4.3	3.1	0.0	16.5	18.2	0.0	12.0	12.0	114.1
3	5.8	314.7	88.1	1.2	5.5	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74.2	0.2	4.3	3.1	0.0	15.2	9.1	0.0	8.4	8.4	133.1
4	3.8	84.4	59.7	1.2	5.5	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	148.4	0.0	4.3	3.1	0.0	13.6	0.0	0.0	4.7	4.7	188.3
5	2.1	25.7	92.3	1.2	5.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.9	0.3	4.3	3.1	0.0	26.2	10.9	0.0	12.9	12.8	451.4
6	2.4	156.6	492.9	1.2	5.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.9	1.0	4.3	3.1	0.0	63.2	38.2	0.0	35.1	35.1	562.6
7	1.6	229.1	326.4	1.2	5.5	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	1.7	370.9	8.1	49.5	35.7	271.1	143.2	76.3	3.3	169.9	169.9	1321.6
8	2.1	11.6	222.0	1.2	5.5	18.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	1.7	370.9	7.8	49.5	35.7	271.1	205.4	47.2	3.3	181.4	181.4	1380.9
9	10.7	33.2	372.4	1.2	5.5	21.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	1.7	370.9	8.0	49.5	35.7	271.1	179.3	63.6	3.3	178.0	178.0	1367.9
10	19.6	52.9	886.8	1.2	5.5	13.4	727.7	73.0	1454.1	536.5	132.3	4.1	0.0	0.5	0.1	1.7	370.9	9.2	2061.9	35.7	447.1	237.5	336.7	25.6	205.3	307.8	6987.8
11	17.3	44.4	107.7	1.2	117.2	15.1	206.6	20.7	412.9	152.3	37.6	1.2	0.0	0.5	0.1	1.7	296.7	8.3	620.9	35.7	321.1	188.9	141.5	9.7	183.5	212.6	2986.0
12	15.5	43.0	122.3	1.2	117.2	16.2	87.7	8.8	175.2	64.6	15.9	0.5	0.0	0.5	0.1	1.7	296.7	9.3	292.0	35.7	292.3	217.7	149.7	6.0	210.6	222.9	2222.6
13	17.4	37.0	72.0	1.2	5.5	17.3	192.8	19.3	385.4	142.2	35.1	1.1	0.0	0.5	0.1	1.7	222.5	8.5	582.8	35.7	317.7	197.9	146.5	9.3	190.0	217.1	2730.4
14	14.5	44.0	38.4	1.2	107.9	17.5	64.1	6.8	140.0	51.7	12.7	0.4	0.0	0.5	0.1	1.7	222.5	9.7	233.2	35.7	286.2	216.9	160.3	5.2	217.0	225.8	2017.1
15	15.8	49.6	36.4	1.2	107.9	17.2	77.1	7.7	154.0	56.8	14.0	0.4	0.0	0.5	0.1	1.7	222.5	9.1	262.6	35.7	289.7	241.9	135.6	5.7	215.3	226.2	2083.1
16	14.9	50.7	23.1	1.2	5.5	30.3	52.1	5.5	113.8	42.0	10.4	0.3	0.0	0.5	0.1	1.7	296.7	9.3	198.8	35.7	283.3	257.4	135.0	4.9	223.7	230.9	1939.0
17	11.9	59.4	69.7	1.2	5.5	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	1.7	370.9	8.6	49.5	35.7	271.1	231.3	87.2	3.3	204.2	204.2	1505.6
18	9.1	68.9	101.2	1.2	5.5	29.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	1.7	519.2	8.2	49.5	35.7	271.1	207.8	72.7	3.3	191.0	191.0	1588.6
19	5.2	40.9	230.1	1.2	5.5	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	667.6	1.8	4.3	3.1	0.0	115.7	76.3	0.0	66.5	66.5	1023.7
20	4.0	8.0	72.9	1.2	5.5	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	667.6	1.3	4.3	3.1	0.0	66.1	58.1	0.0	43.0	43.0	906.3
21	2.9	37.2	79.7	1.2	5.5	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	519.2	1.5	4.3	3.1	0.0	69.2	65.4	0.0	46.6	46.6	774.0
22	3.0	35.3	42.6	1.2	5.5	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	370.9	0.5	4.3	3.1	0.0	59.3	18.2	0.0	26.8	26.8	527.1
23	3.8	111.6	232.5	1.2	5.5	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.3	0.4	4.3	3.1	0.0	40.3	16.4	0.0	19.6	19.6	230.9
24	3.2	9.3	127.5	1.2	5.5	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.3	0.2	4.3	3.1	0.0	26.7	5.5	0.0	11.2	11.1	186.6
Average			168.3	1.2	23.4	13.7	58.7	5.9	118.1	43.6	10.7	0.3	0.0	0.3	0.1	0.9	309.1	4.7	189.6	19.4	149.7	127.2	78.0	3.5	111.0	119.2	1388.3
Percentage Contribution				0.1%	1.7%	1.0%	4.2%	0.4%	8.5%	3.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.1%	22.3%	0.3%	13.7%	1.4%	10.8%	9.2%	5.6%	0.2%	8.0%	8.6%	100.0%

Shaded Area = High Wind Hours

Table 4-6
10/27/2008 Maricopa (MC) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Rail Road	Paved Roads	Construction	CAFOs	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Residential Fuel	Fires	Open Burning	Nonroad	Unpaved Parking Lots	Other	Non-tribal Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Tribal Roads	Total
1	4.5	160	239.9	1.2	3.6	0.0	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.5	0.0	1.5	18.0
2	2.4	106	143.5	1.2	2.3	0.0	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.8	7.5	0.0	3.6	24.4
3	1.6	6	70.3	1.2	2.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	2.6	3.8	0.0	2.4	28.7
4	1.6	348	73.8	1.2	2.4	0.0	35.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.8	40.9
5	2.9	290	98.7	1.2	5.6	0.0	89.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	5.7	4.5	0.0	3.9	108.9
6	2.4	241	91.8	1.2	14.9	0.0	89.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	13.4	15.8	0.0	11.3	144.9
7	1.6	215	129.8	1.2	18.9	0.0	89.2	0.0	0.0	0.0	0.0	0.0	0.2	0.9	10.9	3.6	0.0	14.8	9.6	168.6	24.0	31.6	1.3	86.7	460.2
8	6.9	82	160.4	1.2	27.0	570.3	89.2	0.0	0.0	0.0	0.0	0.0	0.2	0.9	10.9	3.4	0.0	14.8	9.6	168.6	34.5	19.5	1.3	86.1	1036.2
9	16	84	326.2	1.2	24.5	1040.4	89.2	111.0	52.8	64.9	30.9	0.0	0.2	0.9	10.9	3.5	9.0	253.4	9.6	192.8	35.0	40.9	2.1	87.9	2059.9
10	20.7	85	852.9	1.2	23.8	3559.6	89.2	673.4	307.4	378.0	201.3	0.0	0.2	0.9	10.9	4.0	53.8	1435.5	9.6	326.6	57.3	144.8	6.5	99.8	7382.6
11	23.6	81	496.5	1.2	23.6	3328.4	71.3	621.4	283.7	348.8	185.7	0.0	0.2	0.9	10.9	3.7	49.7	1325.6	9.6	314.4	50.9	120.9	6.1	91.4	6847.2
12	21	82	293.2	1.2	26.1	2068.1	71.3	337.4	154.0	189.4	100.9	0.0	0.2	0.9	10.9	4.0	27.0	726.6	9.6	247.7	50.6	98.8	3.9	101.2	4228.8
13	21.9	79	176.0	1.2	27.7	1607.2	53.5	233.6	106.6	131.1	69.8	0.0	0.2	0.9	10.9	3.7	18.7	507.6	9.6	223.4	41.1	69.8	3.1	93.0	3211.7
14	21.6	74	141.9	1.2	27.5	1376.8	53.5	181.7	82.9	102.0	54.3	0.0	0.2	0.9	10.9	4.2	14.5	398.1	9.6	211.2	44.9	84.3	2.7	103.4	2763.7
15	19.9	72	84.8	1.2	30.3	945.8	53.5	88.6	42.2	51.8	24.7	0.0	0.2	0.9	10.9	4.0	7.2	205.4	9.6	187.9	43.8	58.3	1.9	99.3	1866.4
16	17.6	71	76.6	1.2	36.8	773.4	71.3	47.9	22.8	28.0	13.4	0.0	0.2	0.9	10.9	4.0	3.9	117.9	9.6	179.0	42.2	55.9	1.6	100.3	1520.1
17	16	72	68.6	1.2	39.5	648.7	89.2	18.5	8.8	10.8	5.2	0.0	0.2	0.9	10.9	3.7	1.5	54.6	9.6	172.6	36.2	38.5	1.4	93.0	1243.8
18	10.8	62	60.4	1.2	40.9	0.0	124.8	0.0	0.0	0.0	0.0	0.0	0.2	0.9	10.9	3.6	0.0	14.8	9.6	168.6	30.7	30.1	1.3	88.7	525.1
19	8.8	61	56.2	1.2	37.1	0.0	160.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	17.6	31.6	0.0	19.0	266.5
20	9.1	68	45.1	1.2	25.0	0.0	160.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	9.5	24.0	0.0	13.0	232.6
21	11.9	70	36.1	1.2	19.7	0.0	124.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	9.8	27.1	0.0	14.3	196.2
22	12.2	80	30.8	1.2	15.9	14.3	89.2	3.6	1.8	2.2	0.9	0.0	0.0	0.0	0.0	0.2	0.3	7.8	0.0	0.7	6.8	7.9	0.0	5.5	157.1
23	11.3	82	33.2	1.2	10.4	0.0	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	5.1	6.8	0.0	4.6	53.7
24	11.1	78	38.7	1.2	6.2	0.0	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	4.2	2.3	0.0	2.5	41.9
Average			159.4	1.2	20.5	663.9	74.3	96.5	44.3	54.5	28.6	0.0	0.1	0.5	5.5	2.0	7.7	211.5	4.8	106.8	23.8	38.6	1.4	50.6	1435.8
Percentage Contribution				0.1%	1.4%	46.2%	5.2%	6.7%	3.1%	3.8%	2.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.5%	14.7%	0.3%	7.4%	1.7%	2.7%	0.1%	3.5%	100.0%

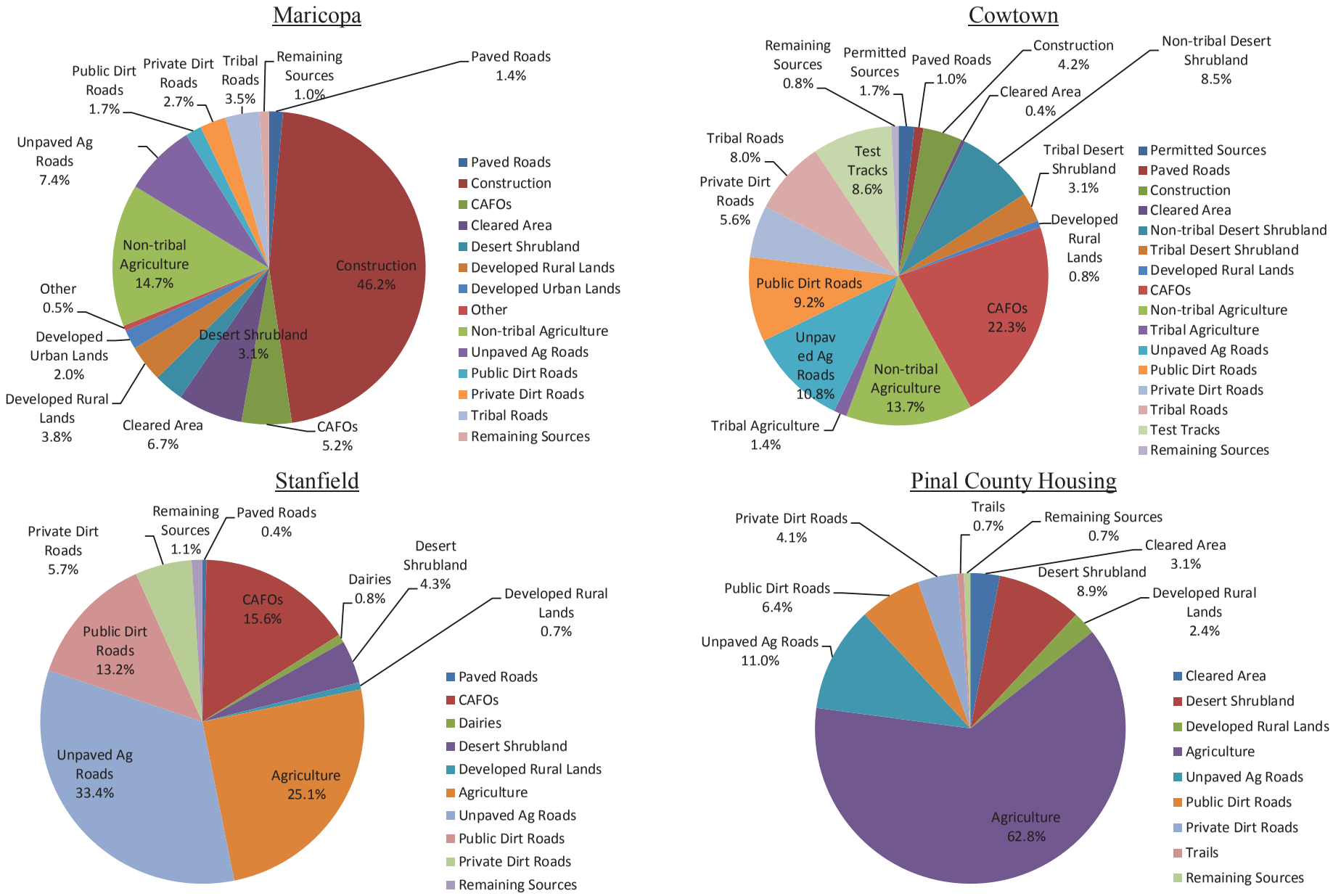
Shaded Area = High Wind Hours

Table 4-7
11/21/2008 Stanfield (STF) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Roads	Permitted Sources	Construction	CAFOs	Dairies	Cleared Area	Desert Shrubland	Developed Rural Lands	Fires	Open Burning	Residential Fuel	Nonroad	Agriculture	Unpaved Parking Lots	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	3.5	119.2	112.4	0.6	0.0	0.0	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	2.8	0.0	32.0
2	3	161.6	59.4	0.4	0.0	0.0	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	19.0	14.2	0.0	48.4
3	3.4	117.3	157.4	0.3	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	7.1	0.0	49.3
4	3.7	125.4	158.4	0.4	0.0	0.0	58.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0	72.7
5	3.2	274.2	102.3	0.9	0.0	0.0	147.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	28.9	8.5	0.0	185.5
6	3.4	240.9	234.2	2.4	0.6	0.0	147.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	56.8	29.8	0.0	236.9
7	13.2	85.5	357.4	4.8	0.6	0.0	203.9	12.5	2.0	99.7	16.6	0.5	0.0	0.0	0.2	535.5	3.3	632.2	142.7	73.2	4.1	1731.8
8	14.7	81.9	326.6	6.9	0.6	2.1	211.6	12.5	2.2	113.1	18.8	0.5	0.0	0.0	0.2	595.8	3.3	635.8	200.4	52.5	4.3	1860.5
9	16.3	82.2	584.6	6.2	0.6	2.1	389.6	12.5	8.0	387.0	64.5	0.5	0.0	0.0	0.2	1985.3	3.3	721.6	216.4	109.5	8.3	3915.6
10	16	81.1	429.2	3.9	0.6	2.1	242.6	12.5	3.1	152.5	25.4	0.5	0.0	0.0	0.2	835.5	3.6	651.4	204.4	117.2	5.0	2260.5
11	16	80.2	334.3	3.9	0.6	2.1	200.1	12.5	2.7	131.6	21.9	0.5	0.0	0.0	0.2	733.2	3.4	645.1	189.8	82.8	4.7	2035.1
12	14.6	80.4	186.1	4.3	0.6	2.1	150.6	12.5	1.1	57.8	9.6	0.5	0.0	0.0	0.2	347.6	3.6	621.1	207.8	104.4	3.6	1527.5
13	12.2	79.2	93.9	4.6	0.6	2.1	102.9	12.5	0.5	25.6	4.3	0.5	0.0	0.0	0.2	203.2	3.4	612.5	183.5	73.0	3.2	1232.6
14	11.1	78.5	65.1	4.5	0.6	2.1	88.2	12.5	0.0	0.0	0.0	0.5	0.0	0.0	0.2	88.2	3.7	605.7	201.7	110.6	2.9	1121.4
15	10.2	75.3	64.8	5.0	0.6	2.1	88.2	12.5	0.0	0.0	0.0	0.5	0.0	0.0	0.2	88.2	3.6	605.7	223.0	87.9	2.9	1120.4
16	8.2	77.2	65.2	8.0	0.6	2.1	117.6	12.5	0.0	0.0	0.0	0.5	0.0	0.0	0.2	88.2	3.6	605.7	238.0	93.6	2.9	1173.6
17	5.9	74.7	87.1	8.6	0.6	2.1	147.1	12.5	0.0	0.0	0.0	0.5	0.0	0.0	0.2	88.2	3.5	605.7	236.9	68.0	2.9	1176.8
18	4	73.8	104.6	8.9	0.0	0.0	205.9	12.5	0.0	0.0	0.0	0.5	0.0	0.0	0.2	88.2	3.4	605.7	204.4	56.7	2.9	1189.3
19	5.3	75.1	88.3	6.1	0.0	0.0	264.7	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	116.5	59.5	0.0	459.7
20	4.6	86.2	56.1	4.1	0.0	0.0	264.7	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	70.4	45.4	0.0	397.4
21	2.3	158.4	98.3	3.2	0.0	0.0	205.9	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	75.9	51.0	0.0	348.8
22	1.9	230.2	249.6	2.6	0.0	0.0	147.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	60.1	14.2	0.0	224.1
23	2.5	270.1	171.6	1.7	0.0	0.0	44.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	38.9	12.8	0.0	97.6
24	2.1	291.4	99.5	1.0	0.0	0.0	44.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.5	4.3	0.0	77.0
Average			178.6	3.9	0.3	0.9	147.1	7.8	0.8	40.3	6.7	0.3	0.0	0.0	0.1	236.5	1.8	314.5	124.3	53.3	2.0	940.6
Percentage Contribution				0.4%	0.0%	0.1%	15.6%	0.8%	0.1%	4.3%	0.7%	0.0%	0.0%	0.0%	0.0%	25.1%	0.2%	33.4%	13.2%	5.7%	0.2%	100.0%

Shaded Area = High Wind Hours

Figure 4-2
High Wind Design Day Source Contributions – 2008



4.2 2018 Estimated Emissions

Consistent with the summary provided in Section 4.1, the methods and activity levels described in Section 3.2 were applied to the modeling domains and land uses detailed in Section 2 to estimate emissions for each parcel under stagnation/low and high wind conditions. A summary of the hourly emission estimates in units of lbs/hour for each of the source categories is presented in Tables 4-8 through 4-10 for Cowtown, Stanfield and Pinal County Housing Stagnation design days and Tables 4-11 through 4-14 for the high wind Pinal County Housing, Cowtown, Maricopa and Stanfield monitors. Pie chart comparisons of the source distribution for each modeling domain are presented in Figure 4-3 for stagnation days and Figure 4-4 for high wind days.

Similar to Section 4.1, information on hourly wind speed (WSPD) in miles/hour, wind direction (WD) in degrees, and PM_{10} observations (µg/m3) is also provided in each of the summary tables. To gain insight into source apportionment, average daily emission estimates are presented along with their percentage contribution to the overall level of PM_{10} emitted. Air quality modeling—which combines information on emissions, location, and meteorology—will provide more detail on each source's contribution to concentrations recorded on the selected design days.

To aid review of the high wind day estimates, the high wind hours (WSPD $\geq$ 12 mph) are shaded to distinguish them from low wind hours. Estimates in the high wind tables show that loose particles entrained during high wind hours are substantially greater than those produced by mechanical activities and combustion during low wind hours.

Trackout for paved roads is included with the paved road estimates to simplify the summaries.

Table 4-8
10/30/2018 Cowtown (CWT) Stagnation Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Rail Road	Permitted Sources	Paved Roads	Construction	CAFOs	Fires	Open Burning	Residential Fuel	Nonroad	Unpaved Parking Lots	Non-tribal Agriculture	Tribal Agriculture	Vehicle Test Tracks	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Tribal Roads	Total
1	2.2	139.7	210.7	0.6	5.5	3.3	0.0	16.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0	15.0	4.4	0.0	5.8	51.9
2	2.9	140.2	296.4	0.6	5.5	2.1	0.0	16.2	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.9	0.0	15.8	22.0	0.0	11.4	74.9
3	3.4	155.5	184.2	0.6	5.5	1.8	0.0	32.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.9	0.0	14.8	11.0	0.0	7.8	75.0
4	3.8	154.4	169.9	0.6	5.5	2.2	0.0	64.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	12.8	0.0	0.0	3.8	90.7
5	2	135.6	89.1	0.6	5.5	5.1	0.0	161.7	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.9	0.0	24.7	13.2	0.0	11.4	223.4
6	0.9	148.6	191.5	0.6	5.5	13.8	0.0	161.7	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.9	0.0	61.0	46.1	0.0	32.2	322.7
7	2.9	158.3	265.2	0.6	5.5	22.4	0.0	161.7	0.6	0.1	0.0	1.4	7.3	19.3	11.2	0.9	316.5	137.8	92.3	3.5	164.0	945.0
8	2.9	58.8	421.2	0.6	5.5	32.0	365.1	161.7	0.6	0.1	0.0	1.4	6.9	19.3	11.2	85.3	316.5	196.1	57.1	3.5	170.8	1433.8
9	2.5	33.7	239.1	0.6	5.5	28.9	365.1	161.7	0.6	0.1	0.0	1.4	7.2	19.3	11.2	85.3	316.5	170.3	76.9	3.5	169.1	1423.1
10	0.9	98.6	120.2	0.6	5.5	21.9	365.1	161.7	0.6	0.1	0.0	1.4	8.2	19.3	11.2	85.3	316.5	194.1	145.0	3.5	196.8	1536.7
11	1.6	112.3	88.7	0.6	117.2	21.6	365.1	129.3	0.6	0.1	0.0	1.4	7.4	19.3	11.2	85.3	316.5	170.4	96.7	3.5	175.1	1521.3
12	2.5	83.4	25.9	0.6	117.2	23.9	365.1	129.3	0.6	0.1	0.0	1.4	8.3	19.3	11.2	85.3	316.5	205.0	149.4	3.5	201.4	1637.9
13	2.7	325.6	86.2	0.6	5.5	25.4	365.1	97.0	0.6	0.1	0.0	1.4	7.6	19.3	11.2	85.3	316.5	180.4	107.6	3.5	181.4	1408.6
14	4	320.7	63.8	0.6	107.9	25.2	365.1	97.0	0.6	0.1	0.0	1.4	8.6	19.3	11.2	85.3	316.5	206.1	171.3	3.5	208.4	1628.0
15	3.1	335.4	30.8	0.6	107.9	27.8	365.1	97.0	0.6	0.1	0.0	1.4	8.1	19.3	11.2	85.3	316.5	228.6	136.2	3.5	204.5	1613.7
16	2.5	325.9	49.8	0.6	5.5	43.5	365.1	129.3	0.6	0.1	0.0	1.4	8.3	19.3	11.2	85.3	316.5	245.0	145.0	3.5	212.1	1592.2
17	1.8	326.7	78.5	0.6	5.5	46.8	365.1	161.7	0.6	0.1	0.0	1.4	7.6	19.3	11.2	85.3	316.5	220.0	105.4	3.5	192.6	1543.3
18	3.4	290.4	298.2	0.6	5.5	48.3	0.0	226.3	0.6	0.1	0.0	1.4	7.4	19.3	11.2	85.3	316.5	198.3	87.9	3.5	180.8	1192.9
19	1.1	252.5	1342.7	0.6	5.5	34.2	0.0	291.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	85.3	0.0	111.1	92.3	0.0	61.3	682.8
20	1.8	249.1	286.5	0.6	5.5	23.1	0.0	291.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	85.3	0.0	63.6	70.3	0.0	40.4	580.8
21	2.7	129.3	451.9	0.6	5.5	18.1	0.0	226.3	0.0	0.0	0.0	0.0	1.2	0.0	0.0	85.3	0.0	66.5	79.1	0.0	43.9	526.6
22	1.6	170.2	264.7	0.6	5.5	14.7	0.0	161.7	0.0	0.0	0.0	0.0	0.4	0.0	0.0	85.3	0.0	56.4	22.0	0.0	23.6	370.3
23	3.4	164.1	282.8	0.6	5.5	9.6	0.0	48.5	0.0	0.0	0.0	0.0	0.4	0.0	0.0	85.3	0.0	38.7	19.8	0.0	17.6	225.9
24	4	148.8	329.8	0.6	5.5	5.7	0.0	48.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0	25.3	6.6	0.0	9.6	102.9
Average			244.5	0.6	23.4	20.9	152.1	134.7	0.3	0.1	0.0	0.7	4.1	9.7	5.6	57.2	158.3	119.1	73.2	1.7	105.2	866.9
Percentage Contribution				0.1%	2.7%	2.4%	17.5%	15.5%	0.0%	0.0%	0.0%	0.1%	0.5%	1.1%	0.6%	6.6%	18.3%	13.7%	8.4%	0.2%	12.1%	100.0%

Table 4-9
10/29/2018 Pinal County Housing (PCH) Stagnation Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observations	Paved Roads	Fires	Open Burning	Residential Fuel	Permitted Sources	Construction	Dairies	Agriculture	Nonroad	Unpaved Parking Lots	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	2.1	100.2	91.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	5.84	2.04	0.00	8.7
2	1.3	122.1	86.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	9.42	10.22	0.00	20.4
3	1.1	73.5	72.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	4.93	5.11	0.00	10.6
4	1.1	144	67.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.99	0.00	0.00	6.5
5	1.1	246	76.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	12.39	6.13	0.00	19.9
6	1.1	142.8	60.1	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	22.18	21.47	0.00	47.4
7	1.1	189.5	145.8	4.7	0.2	0.0	0.0	0.0	0.0	1.7	31.6	0.1	4.1	153.1	57.65	42.94	1.57	297.7
8	1.1	276	287	6.7	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.0	153.1	80.97	26.58	1.57	422.3
9	1.6	133.5	179.2	6.1	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.2	153.1	78.67	35.79	1.57	428.7
10	1.1	300.9	455.2	5.5	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.7	153.1	78.36	67.48	1.57	460.1
11	1.4	18.9	234.8	5.4	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.3	153.1	75.10	44.99	1.57	433.9
12	1.6	259.9	85.6	6.0	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.7	153.1	83.95	69.53	1.57	468.3
13	1.4	308.7	71.4	6.4	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.4	153.1	76.26	50.10	1.57	441.2
14	2.6	263.9	62.7	6.3	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.9	153.1	84.07	79.75	1.57	479.1
15	2.2	292.9	65.6	7.0	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.7	153.1	94.14	63.39	1.57	473.2
16	1.5	244	54.5	8.2	0.2	0.0	0.0	2.7	113.1	1.7	31.6	0.1	4.8	153.1	102.34	67.48	1.57	486.8
17	1.5	294	40.8	8.8	0.2	0.0	0.0	0.0	113.1	1.7	31.6	0.1	4.5	153.1	106.52	49.08	1.57	470.2
18	1.1	300.1	368.4	9.1	0.2	0.0	0.0	0.0	0.0	1.7	31.6	0.1	4.3	153.1	91.25	40.90	1.57	333.8
19	1.1	53	588.4	8.2	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.9	0.0	52.46	42.94	0.00	106.3
20	1.1	57.4	453.5	5.6	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.7	0.0	32.78	32.72	0.00	73.4
21	1.1	91.7	281.6	4.4	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.7	0.0	35.76	36.81	0.00	79.4
22	1.1	82.1	199.3	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	28.30	10.22	0.00	42.4
23	1.1	128.4	128.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	17.78	9.20	0.00	29.5
24	1.1	187.8	114.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	12.32	3.07	0.00	16.9
Average			178.0	4.7	0.1	0.0	0.0	1.0	47.1	1.1	15.8	0.1	2.4	76.6	52.1	34.1	0.8	235.7
Percentage Contribution				2.0%	0.0%	0.0%	0.0%	0.4%	20.0%	0.5%	6.7%	0.0%	1.0%	32.5%	22.1%	14.5%	0.3%	100.0%

Table 4-10
10/29/2018 Stanfield (STF) Stagnation Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Roads	Permitted Sources	Fires	Open Burning	Dairies	Residential Fuel	Construction	CAFOs	Agriculture	Nonroad	Unpaved Parking Lots	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	2.1	251.9	46	0.8	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0	0.0	0.0	0.0	17.9	3.5	0.0	38.9
2	2.3	159.9	79	0.5	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0	0.0	0.1	0.0	24.8	17.4	0.0	59.5
3	3.5	139.5	76.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	33.5	0.0	0.0	0.0	0.0	16.1	8.7	0.0	58.8
4	2.8	155.2	63	0.5	0.0	0.0	0.0	0.0	0.0	0.0	67.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	84.6
5	2.8	99.4	144	1.2	0.0	0.0	0.0	0.0	0.0	0.0	167.4	0.0	0.0	0.1	0.0	35.0	10.5	0.0	214.2
6	1.9	108	183.5	3.2	0.6	0.0	0.0	0.0	0.0	0.0	167.4	0.0	0.0	0.2	0.0	70.7	36.6	0.0	278.7
7	1.8	179.6	187.7	6.5	0.6	0.6	0.0	9.4	0.0	234.8	167.4	73.3	0.2	3.5	635.7	172.2	73.2	3.2	1380.5
8	1.8	171.9	307.2	9.3	0.6	0.6	0.0	9.4	0.0	234.8	167.4	73.3	0.2	3.4	635.7	242.8	45.3	3.2	1426.0
9	1.5	183.8	226	8.4	0.6	0.6	0.0	9.4	0.0	234.8	167.4	73.3	0.2	3.5	635.7	227.2	61.0	3.2	1425.3
10	3.6	82.4	133.2	5.2	0.6	0.6	0.0	9.4	0.0	234.8	167.4	73.3	0.2	3.7	635.7	238.8	115.0	3.2	1487.9
11	3.2	121.4	126.2	5.1	0.6	0.6	0.0	9.4	0.0	234.8	133.9	73.3	0.2	3.5	635.7	221.3	76.7	3.2	1398.3
12	2.9	129.8	116.1	5.7	0.6	0.6	0.0	9.4	0.0	234.8	133.9	73.3	0.2	3.7	635.7	254.4	118.5	3.2	1474.0
13	3	165.8	101.7	6.0	0.6	0.6	0.0	9.4	0.0	234.8	100.4	73.3	0.2	3.6	635.7	227.8	85.4	3.2	1381.0
14	2	112.1	69.7	6.0	0.6	0.6	0.0	9.4	0.0	234.8	100.4	73.3	0.2	3.8	635.7	254.8	135.9	3.2	1458.6
15	2.2	67.2	65.5	6.6	0.6	0.6	0.0	9.4	0.0	234.8	100.4	73.3	0.2	3.7	635.7	283.3	108.0	3.2	1459.8
16	2.4	94.3	43.8	11.2	0.6	0.6	0.0	9.4	0.0	234.8	133.9	73.3	0.2	3.7	635.7	305.4	115.0	3.2	1527.0
17	2.8	59.4	43.8	12.0	0.6	0.6	0.0	9.4	0.0	0.0	167.4	73.3	0.2	3.6	635.7	301.2	83.6	3.2	1290.9
18	2.6	5.3	509.1	12.4	0.0	0.6	0.0	9.4	0.0	0.0	234.4	73.3	0.2	3.5	635.7	262.2	69.7	3.2	1304.6
19	2.5	297.8	341.7	8.0	0.0	0.0	0.0	9.4	0.0	0.0	301.3	0.0	0.0	0.4	0.0	149.7	73.2	0.0	542.0
20	1.8	296.4	628.5	5.4	0.0	0.0	0.0	9.4	0.0	0.0	301.3	0.0	0.0	0.3	0.0	90.8	55.7	0.0	462.9
21	2.9	260.5	124.8	4.2	0.0	0.0	0.0	9.4	0.0	0.0	234.4	0.0	0.0	0.3	0.0	97.7	62.7	0.0	408.8
22	2.2	253.8	72.7	3.4	0.0	0.0	0.0	0.0	0.0	0.0	167.4	0.0	0.0	0.1	0.0	78.5	17.4	0.0	266.9
23	2.9	169.3	93.1	2.2	0.0	0.0	0.0	0.0	0.0	0.0	50.2	0.0	0.0	0.1	0.0	50.9	15.7	0.0	119.1
24	3.5	163.9	106.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	50.2	0.0	0.0	0.0	0.0	34.8	5.2	0.0	91.6
Average			162.1	5.2	0.3	0.3	0.0	5.9	0.0	97.8	139.5	36.7	0.1	1.9	317.8	153.1	58.1	1.6	818.3
Percentage Contribution				0.6%	0.0%	0.0%	0.0%	0.7%	0.0%	12.0%	17.0%	4.5%	0.0%	0.2%	38.8%	18.7%	7.1%	0.2%	100.0%

Figure 4-3
Stagnation Design Day Source Contributions – 2018

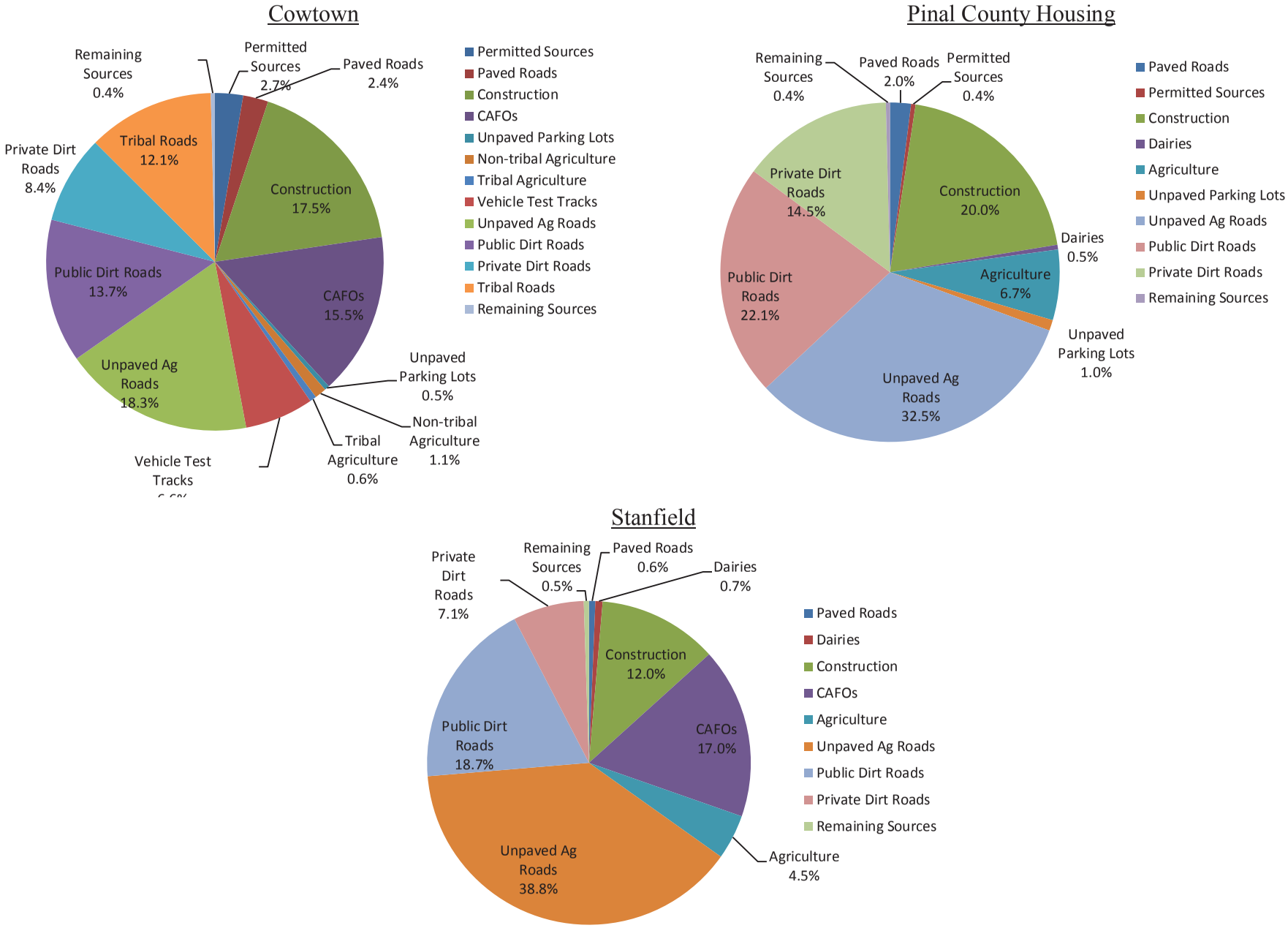


Table 4-11
1/1/2018 Pinal County Housing (PCH) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Roads	Permitted Sources	Fires	Construction	Open Burning	Residential Fuel	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Nonroad	Unpaved Parking Lots	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	1.6	303.8	28.2	0.4	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	9.4	3.6	0.0	13.7
2	1.5	318	21	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	11.4	18.0	0.0	30.1
3	1.9	335.4	22.2	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	8.3	9.0	0.0	17.9
4	2.5	333.7	24.5	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	9.3	0.0	0.0	9.8
5	5.9	352.2	16.4	0.7	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	21.7	10.8	0.0	33.6
6	3.1	299.6	19.1	1.8	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	42.1	37.8	0.0	82.6
7	3.9	339.3	16.2	3.8	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.5	0.3	7.5	285.2	91.8	75.7	4.2	548.3
8	5.7	5	22.7	5.5	2.7	0.3	93.5	0.0	0.0	0.0	0.0	0.0	0.0	79.5	0.3	7.4	285.2	133.5	46.8	4.2	658.9
9	4.8	53.9	34.7	5.0	2.7	0.3	93.5	0.0	0.0	0.0	0.0	0.0	0.0	79.5	0.3	7.5	285.2	129.2	63.1	4.2	670.5
10	16.2	41.2	871.2	2.8	2.7	0.3	93.5	0.0	0.0	44.2	131.9	36.1	4.1	915.8	0.3	8.3	345.7	151.3	142.5	11.9	1891.4
11	21.3	46.3	919.3	2.8	2.7	0.3	93.5	0.0	0.0	182.6	523.5	143.1	18.1	3754.0	0.3	7.8	553.4	190.7	183.8	38.5	5695.0
12	24.9	49.6	1136.1	3.1	2.7	0.3	93.5	0.0	0.0	601.8	1725.7	471.7	59.5	12193.0	0.3	8.4	1169.4	349.6	467.1	117.4	17263.7
13	23.4	48.5	790.7	3.3	2.7	0.3	93.5	0.0	0.0	248.6	712.9	194.9	24.6	5083.8	0.3	7.9	650.5	213.1	230.7	51.0	7518.0
14	22.8	48.3	946.1	3.3	2.7	0.3	93.5	0.0	0.0	132.0	378.6	103.5	13.1	2737.0	0.3	8.6	479.2	186.3	216.1	29.0	4383.5
15	19.1	47.6	320	3.6	2.7	0.3	93.5	0.0	0.0	64.5	192.6	52.6	5.9	1300.1	0.3	8.3	373.4	175.4	146.1	15.5	2434.8
16	22.1	53.6	397.9	6.6	2.7	0.3	93.5	0.0	0.0	123.5	354.2	96.8	12.2	2565.5	0.3	8.4	466.7	202.3	189.6	27.4	4150.0
17	19.8	53.6	281.9	7.0	0.0	0.3	93.5	0.0	0.0	71.9	214.8	58.7	6.6	1440.9	0.3	7.9	383.6	183.0	124.9	16.8	2610.3
18	15	50.6	65.8	7.3	0.0	0.3	0.0	0.0	0.0	19.8	61.6	16.8	1.7	430.3	0.3	7.6	310.3	142.1	81.9	7.4	1087.3
19	15.5	54.6	50.9	4.4	0.0	0.0	0.0	0.0	0.2	11.1	33.2	9.1	1.0	210.7	0.0	1.4	15.2	80.1	81.6	2.0	450.1
20	19.2	58.1	61.5	3.0	0.0	0.0	0.0	0.0	0.2	27.3	81.5	22.3	2.5	516.4	0.0	0.9	37.3	53.8	72.2	4.8	822.1
21	19.2	56.7	70.6	2.3	0.0	0.0	0.0	0.0	0.2	24.8	74.1	20.2	2.3	469.5	0.0	1.0	33.9	56.3	78.1	4.3	767.1
22	19	57.4	67.6	1.9	0.0	0.0	0.0	0.0	0.2	19.8	59.3	16.2	1.8	375.6	0.0	0.4	27.1	44.0	28.6	3.5	578.4
23	17.1	55.7	32.7	1.3	0.0	0.0	0.0	0.0	0.2	9.4	28.2	7.7	0.9	178.4	0.0	0.3	12.9	27.5	21.2	1.7	289.6
24	14.8	54.6	139.3	0.8	0.0	0.0	0.0	0.0	0.2	9.1	28.4	7.8	0.8	161.9	0.0	0.2	11.6	21.6	9.9	1.5	253.7
Average			264.9	3.0	1.0	0.1	39.0	0.0	0.1	66.3	191.7	52.4	6.5	1357.1	0.2	4.2	238.6	105.6	97.5	14.4	2177.5
Percentage Contribution				0.1%	0.0%	0.0%	1.8%	0.0%	0.0%	3.0%	8.8%	2.4%	0.3%	62.3%	0.0%	0.2%	11.0%	4.8%	4.5%	0.7%	100.0%

Shaded Area = High Wind Hours

Table 4-12
4/27/2018 Cowtown (CWT) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Railroad	Permitted Sources	Paved Roads	Construction	Cleared Areas	Non-tribal Desert Shrubland	Tribal Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Residential Fuel Combustion	Fires	Open Burning	CAFOs	Nonroad	Other	Unpaved Parking Lots	Non-tribal Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Tribal Roads	Test Tracks	Total
1	6	332.4	68.3	0.6	5.5	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.0	0.0	0.1	4.3	3.1	0.0	17.7	4.2	0.0	7.8	0.0	68.1
2	0.7	320.5	73.0	0.6	5.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.0	0.0	0.4	4.3	3.1	0.0	18.3	21.0	0.0	14.0	0.0	89.4
3	5.8	314.7	88.1	0.6	5.5	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.3	0.0	0.0	0.2	4.3	3.1	0.0	17.4	10.5	0.0	9.8	0.0	89.1
4	3.8	84.4	59.7	0.6	5.5	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.7	0.0	0.0	0.0	4.3	3.1	0.0	15.2	0.0	0.0	5.5	0.0	103.1
5	2.1	25.7	92.3	0.6	5.5	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	161.7	0.0	0.0	0.3	4.3	3.1	0.0	28.8	12.6	0.0	15.0	0.0	236.9
6	2.4	156.6	492.9	0.6	5.5	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	161.7	0.0	0.0	1.0	4.3	3.1	0.0	71.0	44.2	0.0	41.0	0.0	340.3
7	1.6	229.1	326.4	0.6	5.5	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	161.7	1.7	0.0	8.1	49.5	35.7	271.1	161.2	88.3	3.3	182.7	0.0	992.7
8	2.1	11.6	222.0	0.6	5.5	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	161.7	1.7	0.0	7.8	49.5	35.7	271.1	231.1	54.7	3.3	196.1	0.0	1047.5
9	10.7	33.2	372.4	0.6	5.5	33.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	161.7	1.7	0.0	8.0	49.5	35.7	271.1	199.7	73.6	3.3	192.1	0.0	1036.4
10	19.6	52.9	886.8	0.6	5.5	20.7	467.9	73.0	1454.1	536.5	132.3	16.1	0.0	0.6	0.2	161.7	1.7	0.3	9.2	2061.9	35.7	447.1	262.0	330.0	25.6	224.1	102.5	6369.1
11	17.3	44.4	107.7	0.6	117.2	23.4	132.9	20.7	412.9	152.3	37.6	4.6	0.0	0.6	0.2	129.3	1.7	0.1	8.3	620.9	35.7	321.1	209.4	146.8	9.7	198.6	29.1	2613.5
12	15.5	43	122.3	0.6	117.2	25.1	56.4	8.8	175.2	64.6	15.9	1.9	0.0	0.6	0.2	129.3	1.7	0.0	9.3	292.0	35.7	292.3	243.4	166.0	6.0	230.2	12.3	1884.8
13	17.4	37	72.0	0.6	5.5	26.9	124.0	19.3	385.4	142.2	35.1	4.3	0.0	0.6	0.2	97.0	1.7	0.1	8.5	582.8	35.7	317.7	220.5	153.7	9.3	206.1	27.2	2404.3
14	14.5	44	38.4	0.6	107.9	27.1	41.2	6.8	140.0	51.7	12.7	1.4	0.0	0.6	0.2	97.0	1.7	0.0	9.7	233.2	35.7	286.2	243.2	180.3	5.2	237.7	8.8	1728.9
15	15.8	49.6	36.4	0.6	107.9	26.7	49.6	7.7	154.0	56.8	14.0	1.7	0.0	0.6	0.2	97.0	1.7	0.0	9.1	262.6	35.7	289.7	271.5	150.6	5.7	235.8	10.9	1790.2
16	14.9	50.7	23.1	0.6	5.5	46.4	33.5	5.5	113.8	42.0	10.4	1.1	0.0	0.6	0.2	129.3	1.7	0.0	9.3	198.8	35.7	283.3	289.7	152.0	4.9	245.5	7.2	1617.0
17	11.9	59.4	69.7	0.6	5.5	46.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	161.7	1.7	0.0	8.6	49.5	35.7	271.1	258.3	100.9	3.3	222.7	0.0	1167.1
18	9.1	68.9	101.2	0.6	5.5	45.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	226.3	1.7	0.0	8.2	49.5	35.7	271.1	233.2	84.1	3.3	207.3	0.0	1173.2
19	5.2	40.9	230.1	0.6	5.5	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	291.0	0.0	0.0	1.8	4.3	3.1	0.0	129.6	88.3	0.0	77.7	0.0	625.4
20	4	8	72.9	0.6	5.5	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	291.0	0.0	0.0	1.3	4.3	3.1	0.0	73.8	67.3	0.0	50.3	0.0	517.2
21	2.9	37.2	79.7	0.6	5.5	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	226.3	0.0	0.0	1.5	4.3	3.1	0.0	77.0	75.7	0.0	54.4	0.0	466.0
22	3	35.3	42.6	0.6	5.5	16.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	161.7	0.0	0.0	0.5	4.3	3.1	0.0	66.6	21.0	0.0	31.3	0.0	310.9
23	3.8	111.6	232.5	0.6	5.5	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.5	0.0	0.0	0.4	4.3	3.1	0.0	45.5	18.9	0.0	22.9	0.0	163.9
24	3.2	9.3	127.5	0.6	5.5	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.5	0.0	0.0	0.2	4.3	3.1	0.0	29.8	6.3	0.0	13.0	0.0	121.4
Average			168.3	0.6	23.3	21.2	37.7	5.9	118.1	43.6	10.7	1.3	0.0	0.3	0.1	134.7	0.9	0.0	4.7	189.6	19.4	149.7	142.2	85.5	3.5	121.7	8.2	1123.2
Percentage Contribution				0.1%	2.1%	1.9%	3.4%	0.5%	10.5%	3.9%	1.0%	0.1%	0.0%	0.0%	0.0%	12.0%	0.1%	0.0%	0.4%	16.9%	1.7%	13.3%	12.7%	7.6%	0.3%	10.8%	0.7%	100.0%

Shaded Area = High Wind Hours

Table 4-13
10/27/2018 Maricopa (MC) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Rail Road	Paved Roads	Construction	CAFOs	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Fires	Open Burning	Residential Fuel Burning	Nonroad	Other	Unpaved Parking Lots	Non-tribal Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Tribal Roads	Total
1	4.5	160	239.9	0.6	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.7	0.0	1.8	10.3
2	2.4	106	143.5	0.6	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	1.0	8.5	0.0	4.2	17.3
3	1.6	6	70.3	0.6	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.2	4.3	0.0	2.9	12.4
4	1.6	348	73.8	0.6	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.9	5.8
5	2.9	290	98.7	0.6	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	4.0	5.1	0.0	4.6	21.1
6	2.4	241	91.8	0.6	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	11.0	17.9	0.0	13.2	60.9
7	1.6	215	129.8	0.6	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.1	0.0	10.9	0.0	3.6	14.8	9.6	168.6	18.6	35.7	1.3	90.3	378.0
8	6.9	82	160.4	0.6	32.9	366.7	0.0	0.0	0.0	0.0	0.0	0.3	1.1	0.0	10.9	0.0	3.4	14.8	9.6	168.6	26.5	22.1	1.3	89.6	747.9
9	16	84	326.2	0.6	29.7	742.5	0.0	111.0	52.8	64.9	40.3	0.3	1.1	0.0	10.9	9.0	3.5	253.4	9.6	192.8	26.2	43.3	2.1	91.7	1685.4
10	20.7	85	852.9	0.6	29.0	2755.7	0.0	673.4	307.4	378.0	262.8	0.3	1.1	0.0	10.9	53.8	4.0	1435.5	9.6	326.6	48.8	144.1	6.5	105.6	6553.6
11	23.6	81	496.5	0.6	28.7	2571.0	0.0	621.4	283.7	348.8	242.5	0.3	1.1	0.0	10.9	49.7	3.7	1325.6	9.6	314.4	42.2	118.6	6.1	95.9	6074.3
12	21	82	293.2	0.6	31.6	1563.7	0.0	337.4	154.0	189.4	131.7	0.3	1.1	0.0	10.9	27.0	4.0	726.6	9.6	247.7	41.5	101.9	3.9	107.2	3690.1
13	21.9	79	176.0	0.6	33.6	1195.4	0.0	233.6	106.6	131.1	91.2	0.3	1.1	0.0	10.9	18.7	3.7	507.6	9.6	223.4	33.0	72.2	3.1	97.7	2773.2
14	21.6	74	141.9	0.6	33.4	1011.3	0.0	181.7	82.9	102.0	70.9	0.3	1.1	0.0	10.9	14.5	4.2	398.1	9.6	211.2	36.4	90.0	2.7	109.9	2371.4
15	19.9	72	84.8	0.6	36.8	666.8	0.0	88.6	42.2	51.8	32.2	0.3	1.1	0.0	10.9	7.2	4.0	205.4	9.6	187.9	34.5	63.5	1.9	105.1	1550.3
16	17.6	71	76.6	0.6	43.2	529.0	0.0	47.9	22.8	28.0	17.4	0.3	1.1	0.0	10.9	3.9	4.0	117.9	9.6	179.0	32.8	61.9	1.6	106.2	1217.7
17	16	72	68.6	0.6	46.4	429.3	0.0	18.5	8.8	10.8	6.7	0.3	1.1	0.0	10.9	1.5	3.7	54.6	9.6	172.6	25.3	43.0	1.4	97.6	942.3
18	10.8	62	60.4	0.6	48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.1	0.0	10.9	0.0	3.6	14.8	9.6	168.6	22.1	34.0	1.3	92.7	406.8
19	8.8	61	56.2	0.6	44.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	12.7	35.7	0.0	22.2	116.5
20	9.1	68	45.1	0.6	30.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	6.4	27.2	0.0	15.2	80.0
21	11.9	70	36.1	0.6	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	6.4	30.6	0.0	16.7	78.5
22	12.2	80	30.8	0.6	19.3	11.5	0.0	3.6	1.8	2.2	1.2	0.0	0.0	0.0	0.0	0.3	0.2	7.8	0.0	0.7	4.4	8.9	0.0	6.5	68.7
23	11.3	82	33.2	0.6	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.6	7.7	0.0	5.3	29.9
24	11.1	78	38.7	0.6	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.9	2.6	0.0	2.9	16.5
Average			159.4	0.6	24.7	493.5	0.0	96.5	44.3	54.5	37.4	0.1	0.6	0.0	5.5	7.7	2.0	211.5	4.8	106.8	18.6	40.8	1.4	53.6	1204.8
Percentage Contribution				0.1%	2.0%	41.0%	0.0%	8.0%	3.7%	4.5%	3.1%	0.0%	0.0%	0.0%	0.5%	0.6%	0.2%	17.6%	0.4%	8.9%	1.5%	3.4%	0.1%	4.4%	100.0%

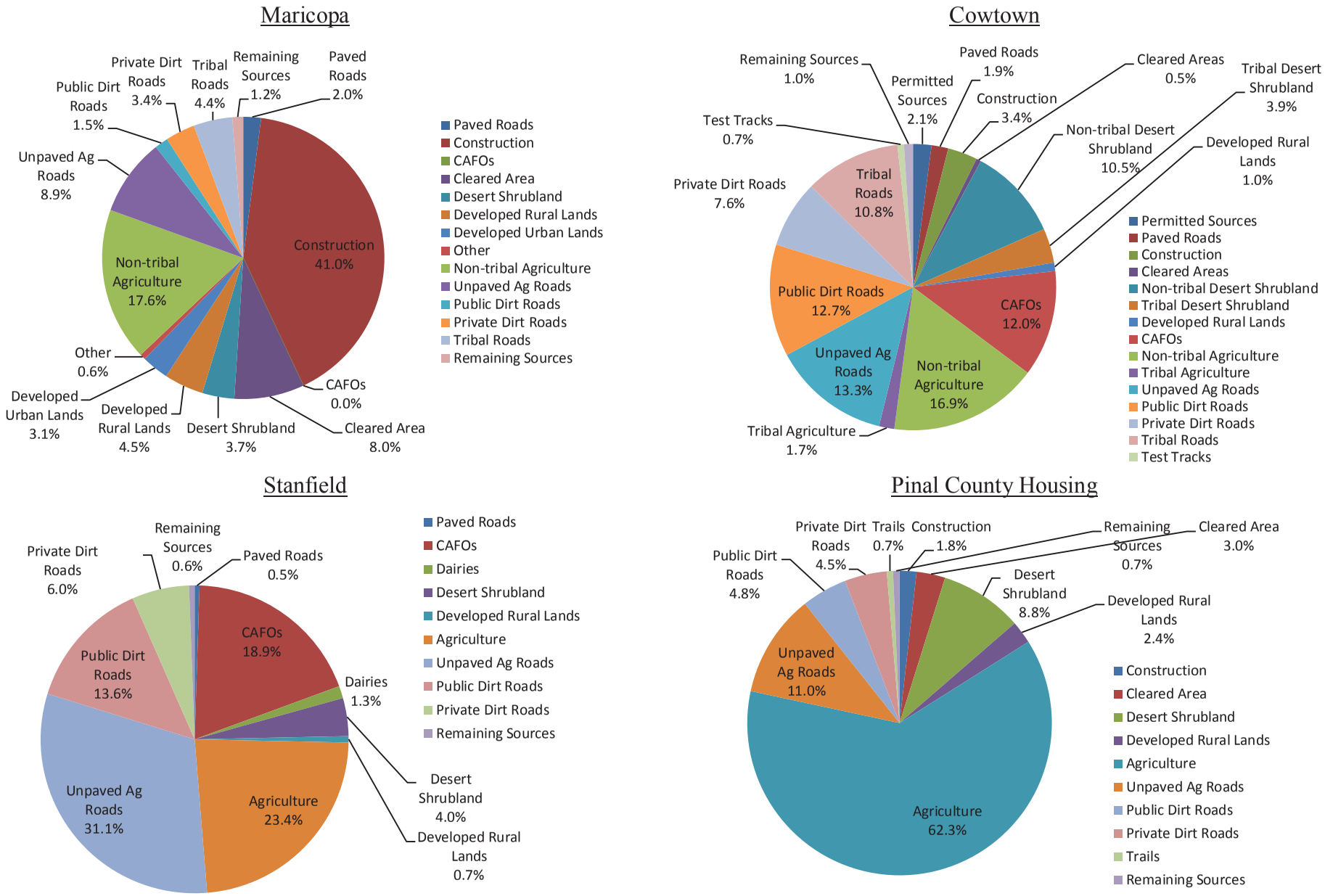
Shaded Area = High Wind Hours

Table 4-14
11/21/2018 Stanfield (STF) High-wind Day Modeling Domain Emissions Inventory (lbs/hour)

Hour	WSPD (mph)	WD (degree)	Monitor Observation	Paved Roads	Permitted Sources	Construction	CAFOs	Dairies	Cleared Area	Desert Shrubland	Developed Rural Lands	Fires	Open Burning	Residential Fuel	Agriculture	Nonroad	Unpaved Parking	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Trails	Total
1	3.5	119.2	112.4	0.8	0.0	0.0	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	3.3	0.0	40.3
2	3	161.6	59.4	0.5	0.0	0.0	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	21.2	16.4	0.0	58.8
3	3.4	117.3	157.4	0.4	0.0	0.0	41.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	8.2	0.0	63.9
4	3.7	125.4	158.4	0.5	0.0	0.0	82.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	98.0
5	3.2	274.2	102.3	1.2	0.0	0.0	206.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	31.6	9.8	0.0	248.8
6	3.4	240.9	234.2	3.2	0.6	0.0	206.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	63.2	34.5	0.0	307.7
7	13.2	85.5	357.4	6.5	0.6	0.0	250.8	24.7	2.0	99.7	16.6	0.6	0.0	0.0	535.5	0.2	3.3	632.2	158.5	82.6	4.1	1817.8
8	14.7	81.9	326.6	9.3	0.6	1.4	256.8	26.3	2.2	113.1	18.8	0.6	0.0	0.0	595.8	0.2	3.3	635.8	222.5	58.2	4.3	1949.2
9	16.3	82.2	584.6	8.4	0.6	1.4	396.8	64.3	8.0	387.0	64.5	0.6	0.0	0.0	1985.3	0.2	3.3	721.6	235.9	117.4	8.3	4003.5
10	16	81.1	429.2	5.2	0.6	1.4	281.2	32.9	3.1	152.5	25.4	0.6	0.0	0.0	835.5	0.2	3.6	651.4	225.7	131.9	5.0	2356.1
11	16	80.2	334.3	5.1	0.6	1.4	229.7	30.1	2.7	131.6	21.9	0.6	0.0	0.0	733.2	0.2	3.4	645.1	208.8	92.6	4.7	2111.8
12	14.6	80.4	186.1	5.6	0.6	1.4	190.8	19.6	1.1	57.8	9.6	0.6	0.0	0.0	347.6	0.2	3.6	621.1	230.5	119.5	3.6	1613.2
13	12.2	79.2	93.9	6.0	0.6	1.4	135.1	15.6	0.5	25.6	4.3	0.6	0.0	0.0	203.2	0.2	3.4	612.5	203.6	83.9	3.2	1299.9
14	11.1	78.5	65.1	6.0	0.6	1.4	123.6	12.5	0.0	0.0	0.0	0.6	0.0	0.0	88.2	0.2	3.7	605.7	224.7	128.0	2.9	1198.0
15	10.2	75.3	64.8	6.6	0.6	1.4	123.6	12.5	0.0	0.0	0.0	0.6	0.0	0.0	88.2	0.2	3.6	605.7	248.8	101.7	2.9	1196.4
16	8.2	77.2	65.2	11.1	0.6	1.4	164.8	12.5	0.0	0.0	0.0	0.6	0.0	0.0	88.2	0.2	3.6	605.7	266.2	108.3	2.9	1266.1
17	5.9	74.7	87.1	12.0	0.6	1.4	206.1	12.5	0.0	0.0	0.0	0.6	0.0	0.0	88.2	0.2	3.5	605.7	263.2	78.7	2.9	1275.5
18	4	73.8	104.6	12.4	0.0	0.0	288.5	12.5	0.0	0.0	0.0	0.6	0.0	0.0	88.2	0.2	3.4	605.7	228.0	65.6	2.9	1308.0
19	5.3	75.1	88.3	8.0	0.0	0.0	370.9	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	129.9	68.9	0.0	590.6
20	4.6	86.2	56.1	5.4	0.0	0.0	370.9	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	78.4	52.5	0.0	520.0
21	2.3	158.4	98.3	4.2	0.0	0.0	288.5	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	84.3	59.1	0.0	448.9
22	1.9	230.2	249.6	3.4	0.0	0.0	206.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	67.2	16.4	0.0	293.3
23	2.5	270.1	171.6	2.2	0.0	0.0	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	43.6	14.8	0.0	122.6
24	2.1	291.4	99.5	1.3	0.0	0.0	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.5	4.9	0.0	98.6
Average			178.6	5.2	0.3	0.6	191.0	13.1	0.8	40.3	6.7	0.3	0.0	0.0	236.5	0.1	1.8	314.5	138.0	60.7	2.0	1012.0
Percentage Contribution				0.5%	0.0%	0.1%	18.9%	1.3%	0.1%	4.0%	0.7%	0.0%	0.0%	0.0%	23.4%	0.0%	0.2%	31.1%	13.6%	6.0%	0.2%	100.0%

Shaded Area = High Wind Hours

Figure 4-4
High Wind Design Day Source Contributions – 2018



5. ANNUAL EMISSIONS INVENTORY

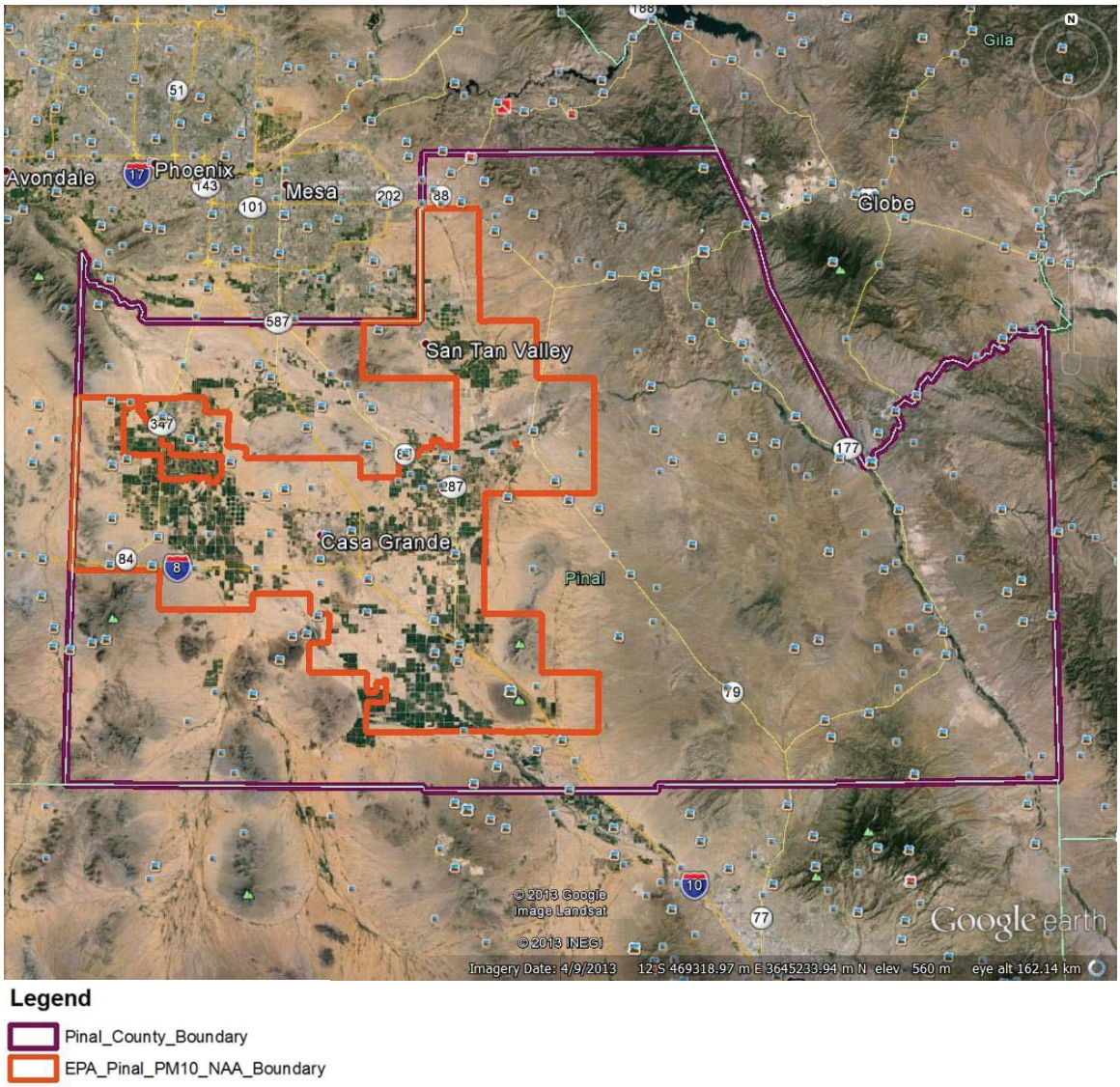
EPA designated the western portion of Pinal County, excluding tribal lands, as nonattainment for the 24-hour PM_{10} national ambient air quality standard (NAAQS) in 2012. Title I of the 1990 Clean Air Act Amendments requires the development of a baseline emission inventory and periodic revisions for areas that fail to meet the NAAQS. The earlier sections of this report addressed the requirement to develop baseline emission inventory estimates for the design days and related modeling domains selected to demonstrate attainment; this section addresses the requirement to develop an annual baseline emissions inventory for the entire PM_{10} nonattainment area. As noted in the Inventory Preparation Plan, also prepared earlier to guide compilation of these baseline inventories, an annual emissions inventory helps identify which sources and source categories predominate in the generation of PM_{10} emissions across the nonattainment area. This ranking of source significance provides the basis for analysis of long-term emission trends impacted by changes in source activity rates and implementation of regulatory control strategies.

A map of Pinal County and the PM_{10} nonattainment area is displayed in Figure 5-1. The County, as reported on its website,[103] covers an area of about 5,400 square miles and is comprised of two distinct geographic regions: an eastern portion characterized by mountains reaching 6,000 feet in elevation, and a western area consisting primarily of low desert valleys hosting irrigated agricultural land. As can be seen in Figure 5-1, the nonattainment area is an irregular shape that covers the western portion of the County with an area of 1,325.2 square miles. It should also be noted that while Indian lands are located within the boundaries of the nonattainment area, and within the Maricopa and Cowtown monitoring station modeling domains, these lands are not designated nonattainment for the 24-hour PM_{10} NAAQS and, therefore, are not included in this annual emissions inventory.

The spatial distribution of estimated PM_{10} emissions within the nonattainment area was facilitated by GIS shapefiles provided by ADEQ and PCAQCD that provide information on land use, population, etc. For several source categories (e.g., nonroad vehicles and equipment), emissions in the nonattainment area were estimated from available county-wide values adjusted by the ratio of nonattainment area population to the county total. For other source categories (e.g., construction, confined animal feeding operations (CAFOs), and railroads), estimates are based on activity rates of sources within the nonattainment area and emissions factors representative of these sources.

[103] *http://pinalcountyaz.gov/Departments/BudgetOffice/Documents/BB0607/countyoverview.pdf*

Figure 5-1
Comparison of Pinal County and Western Pinal County
PM_{10} Nonattainment Boundaries



Following the approach described in Section 3, separate estimates of emissions were prepared for low and high wind conditions. Where appropriate, local precipitation event data were factored into the annual fugitive dust emissions calculations according to EPA guidance (e.g., such as reported for paved and unpaved road emissions in AP-42[104]). Since the Maricopa Association of Governments (MAG) is responsible for the development of transportation conformity budgets for the Western Pinal County PM_{10} nonattainment area, emissions data and assumptions derived from these budgets, as discussed in in Section 3, were used to prepare annual emission estimates for on-road sources in this section. Summaries of the methods and data sources used to estimate emissions for PM_{10} source categories that are significant in the nonattainment area are presented below.

[104] Compilation of Air Pollutant Emissions Factors, AP-42, U.S. Environmental Protection Agency, *http://www.epa.gov/ttn/chief/ap42/index.html*, accessed on July 29, 2013.

5.1 Low Wind Emissions Inventory

Descriptions of the adjustments made to the Section 3.1.1 low wind methodologies to estimate annual emissions in 2008 and 2018 are presented in the subsections below. No estimates are provided for emissions on tribal lands because these areas are not included in the nonattainment designation. The remainder of the source discussions are presented in the order in which they occur in Section 3.1.1.

5.1.1 Agriculture Emissions

To compute annual emissions within the entire nonattainment area, the methods presented in Section 3.1.1.1 were adjusted to:

- Develop estimates of total areas within the nonattainment area devoted to cultivation of locally-prominent crops;
- Develop an estimate of the total acreage considered to be fallow; and
- Eliminate adjustments for diurnal variations, which are not germane to annual emission estimates.

While the Arizona Cotton Research and Protection Council (CRPC) provided detailed information on crops under cultivation within 6 kilometers of each high wind monitor, no similar information is available for portions of the nonattainment area outside these zones. A review of available data sources found that the 2007 Agricultural Census[105] contained county-specific information on farm operations in Arizona, including total acres harvested by crop. Recognizing that farmers respond to market conditions and that decisions on crops to plant/harvest change year to year, the county agricultural agent was contacted for information on crops under cultivation in 2008.[106] He provided information from the 2008 Arizona Agricultural Statistics Bulletin on acres in production in Pinal County for a limited number of crops. A comparison of these values with those reported in the 2007 Agricultural Census found total cultivated acreages to be roughly equivalent (~ 12,000 acre difference = 6% of the county total) and the crop distributions to be similar. However, the Census provided more valuable detail on the crops under cultivation. For this reason, the 2007 Census values for Pinal County were used to characterize the crop distribution in the PM_{10} nonattainment area in 2008. Table 5-1 provides a summary of the acreage and percentage distribution by crop type found in the 2007 Census data.

[105] http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Arizona/cp04021.pdf

[106] Phone conversation with Rick Gibson, University of Arizona Cooperative Extension and Bob Dulla, August 23, 2013

Table 5-1 Acres of Crops Under Cultivation in 2007 Agricultural Census for Pinal County		
Crop	Acres	Percent
Field Crops		
Barley for Grain	11,718	6.1%
Corn for Grain	1,101	0.6%
Cotton	73,718	38.3%
Sorghum for Grain	10,255	5.3%
Wheat for Grain	19,316	10.0%
Field Seeds, Hay, Forage, Silage		
Field and Grass Seed	2,836	1.5%
Forage - All Hay, Haylage, Silage & Green chop	63,811	33.2%
Vegetables – Total	9,611	5.0%
Total	192,366	100.0%

Since annual tilling emissions are based on the number of passes per year and harvesting emissions are based on lbs/acre-year, crop calendar information was not used to prepare the annual emission estimates. Total annual PM_{10} emissions and annual-average day emissions are presented in Table 5-2 for tillage operations and in Table 5-3 for harvest operations by crop type. The acreage values presented in the tables are derived from the GIS shapefiles provided by ADEQ and PCAQCD. The total number of agricultural acres in the nonattainment area was reduced by 3.02% to account for the average share of fallow land found within each of the modeling domains.

For the 2018 annual inventory, no change was made to the amount of land under cultivation or the methods employed in the 2008 calculations. Agricultural emissions were held constant from 2008 to 2018.

Table 5-2 2008 Crop Acreage, Annual PM_{10} Tillage Emissions, and Typical Daily Tillage Emissions in Pinal PM_{10} Nonattainment Area					
Crop	Acres	Tillage Passes (per year)	PM_{10} Annual Emissions (tons/year)	Tillage Operation (Days/year)	Typical Tillage Day Emissions (lbs/day)
Alfalfa	80,116	5.1	657	91	14,429
Corn	1,382	7.3	16	152	213
Grain	51,839	3.1	258	243	2,125
Cotton	92,554	8.8	1,309	364	7,191
Hay	3,561	5.1	29	91	641
Vegetable	12,067	14.0	271	182	2,983
Total	241,518	N/A	2,540	N/A	27,583

Table 5-3 2008 Crop Acreage, Annual PM_{10} Harvesting Emissions, and Typical Daily Harvesting Emissions in Pinal PM_{10} Nonattainment Area					
Crop	Acres	PM_{10} Emission Factor (lbs/acre-yr)	PM_{10} Annual Emissions (tons/year)	Harvest (Days/year)	Typical Harvest Day Emissions (lbs/day)
Alfalfa	80,116	0.0	0	294	0
Corn	1,382	1.7	1	91	26
Grain	51,839	5.8	150	60	5,011
Cotton	92,554	3.4	157	143	2,201
Hay	3,561	1.7	3	294	21
Vegetable	12,067	0.17	1	116	18
Total	241,518	N/A	313	N/A	7,276

5.1.2 Concentrated Animal Feeding Operations (CAFO)

Annual PM_{10} emissions generated by CAFOs within the nonattainment area in 2008 were computed using the average daily PM_{10} emission factor described in Section 3.1.1.2 and 2008 animal population averages for affected facilities provided by representatives of the Arizona Cattle Feeders Association. The daily PM_{10} emission factor for CAFOs, in units of pounds of PM_{10} per animal head-day, was computed from the medians of hourly emissions factors per the recommendation of Bonifacio et al.[107] in their assessment of PM_{10} emissions from two CAFOs in Kansas. Because the hourly emissions factors were calculated from a subset of the 2008 hourly PM_{10} and meteorological data collected at the Cowtown monitoring station, these factors represent annual average values and not design-

[107] "Particulate matter emission rates from beef cattle feedlots in Kansas – Reverse dispersion modeling," Bonifacio, H.F., R.G. Maghirang, B.W. Auvermann, E.B. Razote, J.P. Murphy, and J.P. Harner III; JAW&MA 62(3)350-361, 2012.

day-specific values. Thus, the daily emission factor computed in Section 3.1.2 represents an annual-average-day value that is appropriate for use in compiling an annual inventory for the nonattainment area.

Annual-average-day animal population values for each of the nine CAFOs located in the nonattainment area were provided by the Arizona Cattle Feeders Association.[108] These population values were multiplied by the average daily PM_{10} emission factor to derive daily PM_{10} emission rates for each CAFO, and these rates were further multiplied by 366 to determine annual PM_{10} emissions. The annual emissions rates for all of the CAFOs in the nonattainment area were summed to determine total annual PM_{10} emissions in 2008 for this source category. The cattle head counts on December 31, 2012, were also provided by Arizona Cattle Feeders Association. Section 3.2.1describes the approach used to project the cattle counts in 2018.

A summary of the facilities, the head counts, and related emissions in 2008 and 2018 is presented in Tables 5-4 and Table 5-5, respectively.

Table 5-4
Summary of the 2008 Annual Emissions and Typical Daily Emissions for CAFOs in Western Pinal County PM_{10} Nonattainment Area

Facility	# Head	Emission Factors (lbs/head/day)	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
Pinal East Pens	18,426	0.066	222	1,212
Pinal West (W of Fuqua)[a]	15,543	0.066	187	1,023
Pinal West (E of Fuqua)[a]	33,286	0.066	401	2,190
Owen Kelly Feed Yard	5,900	0.066	71	388
Maricopa Cattle Company West	19,828	0.066	239	1,305
Maricopa Cattle Company East	17,163	0.066	207	1,129
Red River Feed Yard	52,315	0.066	630	3,442
Benedict Feed Yard	52,263	0.066	629	3,439
Paradise Cattle	2,400	0.066	29	158
Total	217,124	N/A	2,614	14,286

a. Fuqua Road is at the mile mark between White & Parker Road and Hartman Road.

[108] Conference call with Bas Aja/Arizona Cattle Feeders Association and staff of the Arizona Department of Environmental Quality and Pinal County Air Quality Control District, May 13, 2013; and email correspondence from Bas Aja dated June 11, 2013.

Table 5-5 Summary of the 2018 Annual Emissions and Typical Daily Emissions for CAFOs in Western Pinal County PM_{10} Nonattainment Area				
Facility[b]	# Head	Emission Factors (lbs/head/day)	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
Pinal East Pens	0	0.066	0	0
Pinal West (W of Fuqua)[a]	15,645	0.066	188	1,029
Pinal West (E of Fuqua)[a]	33,497	0.066	403	2,204
Owen Kelly Feed Yard	0	0.066	0	0
Maricopa Cattle Company West	0	0.066	0	0
Maricopa Cattle Company East	0	0.066	0	0
Red River Feed Yard	48,452	0.066	583	3,188
Benedict Feed Yard	37,000	0.066	445	2,434
Total	134,594	N/A	1,621	8,856

a. Fuqua Road is at the mile mark between White & Parker Road and Hartman Road.
b. Paradise Cattle ceased operation as a CAFO between 2008 and 2018.

5.1.3 Fugitive Dust and Exhaust Emissions from Paved Roads

Fugitive PM_{10} emissions from paved roads were calculated using the guidance in section 13.2.1 of AP-42. The new AP-42 equation published by EPA in January 2011 has been applied to estimate PM_{10} emissions from paved roads in the nonattainment area.

In the AP-42 equation, paved road emissions are a function of silt loading values and the average weight of vehicles traveling on paved road surfaces. Paved roads have been classified as freeways, high-traffic arterials, and low-traffic arterials to reflect different silt loading assumptions. An arterial carrying a traffic volume of less than 10,000 vehicles per average weekday is classified as low-traffic; all other roads that are not freeways are classified as high-traffic arterials. The silt loading levels used in this inventory, in grams per square meter, are 0.02 for freeways, 0.067 for high-traffic arterials, and 0.23 for low-traffic arterials. The silt loadings and average vehicle weights were derived from the MAG 2012 Five Percent Plan for PM-10 in the Maricopa County nonattainment area. The fugitive dust emission factors for paved roads were calculated using the following AP-42 equation:

$$E = k \times sL^{0.91} \times W^{1.02} \times (1 - P/4N)$$

where:

E = annual average particulate emission factor (g/mile);

k = particle size multiplier for particle size range (1.0 g/mile for PM_{10} and 0.25 g/mile for $PM_{2.5}$);

sL = road surface silt loading (0.02 g/m^2 for freeways, 0.067 g/m^2 for high-traffic arterials, and 0.23 g/m^2 for low-traffic arterials);

W = average weight of the vehicles traveling on the roads (3.53 tons on freeways and 2.65 tons on arterials);

P = annual number of "wet" days with at least 0.254 mm (0.01 in) of precipitation (31 days in 2008); and

N = annual number of days (366 days in 2008).

The annual average PM_{10} emission factors for paved roads derived from the AP-42 equation are presented in Table 5-6.

Table 5-6
2008 Paved Road Emission Factors

Silt Loading Category	PM_{10} Emission Factor (g/mile)
Freeways	0.10
High Traffic Arterials	0.23
Low Traffic Arterials	0.69

The 2008 vehicle miles of travel (VMT) by silt loading category was used to estimate paved road fugitive PM_{10} emissions. Daily VMT by silt loading category is shown in Table 5-7. The 2008 VMT for the West Pinal PM_{10} nonattainment was obtained from MAG's TransCAD model outputs for the year 2008 in the PM_{10} area. These emission factors were multiplied by road segment specific VMT which had been estimated via the MAG TRANSCAD model. For those road segments identified by PCAQCD as containing trackout, the emission factor was increased 381% as described in section 3.1.1.6. Paved road reentrained fugitive dust was then summed for all road segments in the nonattainment area.

Bow wake was also calculated for those roadways identified ADOT within the nonattainment area using the methodology described in section 3.1.1.3. The sum of reentrained fugitive dust and bow wake emissions are presented in Table 5-7.

Table 5-7
2008 Paved Road Dust Emissions for the West Pinal PM_{10} Nonattainment Area

Bow Wake Emissions (lb/day)	Road Dust Emissions (lbs/day)	Total Emissions (lbs/day)	Total Emissions (tons/yr)
97	4,964	5,061	926

The 2018 VMT for paved road segments was interpolated from MAG's TransCAD model results for 2015 and 2025. The travel network links and road categories were defined from MAG's 2015 model results.

Emission factors from Table 5-6 are applied to the individual road segment VMT to produce the total daily and annual emissions in Table 5-8. Road segments identified to contain trackout or produce bow wake emissions in 2008 were also assumed to do so in 2018.

Table 5-8
2018 Paved Road Dust Emissions for the West Pinal PM_{10} Nonattainment Area

Bow Wake Emissions (lb/day)	Road Dust Emissions (lbs/day)	Total Emissions (lbs/day)	Total Emissions (tons/yr)
136	6,636	6,773	1,239

Vehicle exhaust, tire- and brake-wear, and starting emissions were also summed on an annual emissions basis for the entire PM_{10} nonattainment area. The emission inventory calculations for the annual totals are calculated using MOVES inventory simulations. With few exceptions, the MOVES simulations are configured in the same way as the runs used in the paved road emissions methods section. MOVES is configured to operate in inventory mode and outputs are summed at the annual level across source types and road types. The meteorology data for the MOVES simulation use annual monthly temperature profiles for Casa Grande.[109] The VMT is multiplied by the total days in the year (366 in 2008 and 365 in 2018. Tables 5-9 and 5-12 show the total paved road emissions over all sources.

Table 5-9
2008 Paved Road Emissions Totals

Source Process	PM_{10} Nonattainment Area Emissions (tons/year)
Fugitive Dust	908
Bow Wake	18
Exhaust, Tire and Brake	255
Totals:	1,181

[109] These data were downloaded from *ftp://ftp.ncdc.noaa.gov/pub/data/noaa/2008/* on July 3, 2013.

Table 5-10 2018 Paved Road Emissions Totals	
Source Process	PM_{10} Nonattainment Area Emissions (tons/year)
Fugitive Dust	1,211
Bow Wake	25
Exhaust, Tire and Brake	172
Totals:	1,408

5.1.4 Fugitive Dust and Exhaust Emissions from Unpaved Roads

Fugitive PM_{10} emissions from unpaved roads were calculated using the guidance in Section 13.2.2 of AP-42. AP-42 emission factors were applied to unpaved road VMT values to estimate fugitive PM_{10} emissions. The unpaved road particulate emission factors were derived from the following AP-42 equation for publicly accessible unpaved roads.

$$E = \left[\frac{k\left(\frac{s}{12}\right)^{1}\left(\frac{S}{30}\right)^{0.5}}{\left(\frac{M}{0.5}\right)^{0.2}} - C \right]\left(1 - \frac{P}{N}\right)$$

where:

E = annual average particulate emission factor adjusted for natural mitigation (lb/mile);

k = particle size multiplier for particle size range (1.8 lb/mile for PM_{10} and 0.18 lb/mile for $PM_{2.5}$);

s = surface material silt content;

S = mean vehicle speed;

M = surface material moisture content;

C = emission factor for 1980s vehicle fleet exhaust, brake wear, and tire wear (0.00047 lb/mile for PM_{10});

P = annual number of "wet" days with at least 0.254 mm (0.01 in) of precipitation (31 days in 2008); and

N = annual number of days (366 days in 2008, 365 in 2018).

Four categories of unpaved roads have been identified in Pinal County: agricultural, public, private, and trails. The surface material silt and moisture contents for each category are

shown in Table 5-11. The silt and moisture contents were obtained from a Pinal County field study conducted in June 2013.

Subcategories were developed for agricultural, public, and private unpaved roads to account for variations in average vehicle speeds and annual average daily traffic (ADT). Speeds for each subcategory are identified in Table 5-11; ADT, mileage, and VMT are listed in Table 5-12. The ADT and speed values for public and private roads and trails were obtained from the PCAQCD Traffic Analysis Report cited in Section 3.1.1.4 and public and private road ADT was scaled from the base year of 2013 to account for increased travel over time due to population increases, as described in Section 3.1.1.4. The ADT and speed values for agricultural roads were calculated from information provided by Pinal County farmers for non-harvest and harvest activities, also cited in the same section and were assumed to stay constant through time. ADT is multiplied by total mileage to calculate daily VMT. The PM_{10} emission factors were multiplied by the VMT in Table 5-12 to produce unpaved road emissions for the PM_{10} nonattainment area in 2008, which are summarized by category in Table 5-13.

The PM_{10} exhaust emissions were also calculated for the PM_{10} nonattainment area. Unpaved exhaust emission rates were calculated using vehicle-population-weighted average exhaust emission rates for a given unpaved road's speed bin. Separate rates were extracted for 2008 and 2018 using results from the existing Pinal County configured MOVES results. Exhaust rates were averaged over road types and weighted by vehicle population to create an average PM_{10} rate for each of the 16 MOVES speed bins. A county average vehicle population was assumed to be traveling on the unpaved roads and the road's average speed was used to then select an appropriate exhaust emission rate. This exhaust emission rate was then multiplied by the daily VMT and number of days in the year to determine the PM_{10} total exhaust an annual basis. The combined PM_{10}

Table 5-11 Pinal County Inputs to AP-42 Equation for Unpaved Roads			
Subcategory	Silt Content	Moisture Content	Speed
Agricultural			
Operations	14.9%	0.8%	28.2 mph
Inspection			28.2 mph
Harvest			21.2 mph
Public			
Class A	7.1%	0.3%	29 mph
Class B			44 mph
Class C			37 mph
Class D			47 mph
Class E			40 mph
Private			
Non-Irrigation	14.4%	0.3%	25 mph
Principal Canal			25 mph
Secondary Canal			15 mph
Trails			
	14.4%	0.3%	15 mph

exhaust emissions from each unpaved road category, which are relatively small compared to total fugitive dust emissions, are also presented in Table 5-13 for 2008, and Table 5-14 for 2018.

Except for unpaved public and private roads and the number of calendar days per year between 2008 (366 days) and 2018 (365 days), the methods and travel activity employed in the 2008 calculation for the unpaved road emissions (unpaved Ag road, unpaved private road, unpaved trails, and test tracks) were held constant between 2008 and 2018.

For the unpaved public roads, numerous projects were completed between 2008 and the end of 2018. Based on the information provided by local public works departments and municipal planning organizations, these projects were digitized and the locations reviewed to determine whether they fell within the PM_{10} nonattainment area. Emissions from those roadways located within the nonattainment area were controlled dependent on the improvement project type. Improvement project dependent control efficiencies are reported in Table 3-65.

Table 5-12 2008 Unpaved Road Emission Factors and Daily VMT				
Subcategory	PM_{10} Emission Factor (g/mi)	Daily VMT	Average Daily Traffic	Miles of Road
Agricultural				
Operations	819.31	10,454	11.33	923
Inspection	819.31	32,071	11.33	2,831
Harvest	710.59	8,157	19.34	422
Public				
Class A	481.29	2,040	22.74	90
Class B	592.88	18,710	78.22	239
Class C	543.66	7,914	88.23	90
Class D	612.77	17,623	147.35	120
Class E	565.28	30,024	502.07	60
Private				
Non-Irrigation	906.50	20,310	22.74	893
Principal Canal	906.50	2,022	13.64	148
Secondary Canal	702.13	2,029	2.74	744
Trails				
	702.13	2,488	2.00	1,244

Table 5-13 2008 Unpaved Road Emissions for the West Pinal PM_{10} Nonattainment Area		
Unpaved Road Category	Typical Daily Emissions (lbs/day)	Annual Emissions (tons/yr)
Agricultural	89,591	16,395
Public	102,722	18,798
Private	50,419	9227
Trails	3,851	705
Test Track	1,447	265
Exhaust Emissions	17	3
Total	248,030	45,389

Table 5-14 2018 Unpaved Road Emissions for the West Pinal PM_{10} Nonattainment Area		
Unpaved Road Category	Typical Daily Emissions (lbs/day)	Annual Emissions (tons/yr)
Agricultural	89,591	16,350
Public	94,797	17,301
Private	58,898	10,749
Trails	3,852	703
Test Track	1,447	265
Exhaust Emissions	15	3
Total	248,585	45,367

5.1.5 Nonroad Emissions

The same general nonroad exhaust emission calculation methodology used for preparing the modeling domain inventories (described in Section 3) was also used to calculate annual nonroad emissions for the nonattainment area. Pinal County-specific emissions[110] were determined using EPA's NONROAD model,[111] which included Pinal County-specific input values where available. As described below, in the absence of sector-specific information for the entire nonattainment area county-wide nonroad emissions were allocated to the nonattainment area using a nonattainment area to county household ratio.[112]

NONROAD Calculation Methodology – EPA's NONROAD emissions model calculates emissions from each source according to the methodology described below. Note that this calculation yields emission results in grams per year, which the model then converts to tons.

$$Emissions = EF \times DF \times P \times LF \times Hours \times Units$$

where:

EF = emission factor in g/hp-hr
DF = deterioration factor (dimensionless)
P = equipment horsepower
LF = load factor (dimensionless)
Hours = annual operating hours for each unit
Units = total population of engines operating in a given year

Pinal County Inputs – Total emissions estimates for Pinal County were estimated for calendar year 2008 by determining totals for each of the 12 months, using average ambient

[110] Input files are included in Exhibit 8.
[111] U.S. EPA NONROAD Model, Version 2008a, released July 2009.
[112] The ratio (i.e., 102,441 / 153,156 = 66.9%) was determined using 2010 Pinal County household data from U.S. Census data (http://www.census.gov/en.html) at the census block level.

temperatures specific to each.[113] Calendar year 2008 summertime and wintertime fuel parameters for both Diesel and gasoline, shown below in Table 5-15, were obtained from the 2008 North American fuel surveys published by the Alliance of Automobile Manufacturers (AAM), and were verified by staff at the PCAQCD. Gasoline and Diesel parameters are based on values reported in the Phoenix area; it is assumed that the fuel mix used in Phoenix during calendar year 2008 is delivered to the Pinal County nonattainment area as well because the fuel requirements are the same in both areas.[114]

Table 5-15
NONROAD Modeling Fuel Parameters Pinal County – CY 2008

Fuel Parameter	NONROAD Default	Pinal County (2008)	
		Winter	Summer[a]
Fuel RVP for gas	8.0	8.8	6.6
Oxygen Weight (%)	2.44	3.5	0.0
Gas Sulfur (%)	0.0339	0.0015	0.0039
Diesel Sulfur (%)	0.0351	0.0006	0.0006
CNG/LPG Sulfur (%)	0.003	0.003	0.003
Stage II Control (%)	0	0[b]	0[b]
EtOH Blend Market (%)	75.1	100	0
EtOH Volume (%)	9.3	10	0

a. A "Summer" fuel blend is required in virtually all parts of the nonattainment area during June-September.
b. Note that while Stage II controls are required at the highest volume stations in Pinal County's "Area A," we assumed zero Stage II coverage both to be conservative and to simplify the analysis.

Nonroad Emission Allocation Methodology – All county-wide emissions from the equipment categories listed in Table 5-16 below were allocated to the nonattainment area using resident household data. As was the case with the nonroad analysis presented in Section 3, the "Pleasure Craft" and "Railway Maintenance" equipment categories were excluded due to the absence of recreational areas and rail yards in the nonattainment area that would accommodate their use.

Nonroad emissions were calculated for the 2018 calendar year, shown below in Table 5-17, using population projections to project emissions from those calculated in the 2008 NONROAD model run to 2018. This was growth was projected for all sectors except agricultural, which was assumed to have no growth to be consistent with agricultural growth assumptions previously outlined. As fuel parameters are likely to change between 2008 and 2018 to become cleaner burning and Tier 4 Diesel engines are also likely to begin phasing-in over this period, it is expected that growth of emissions in this way is a conservative approach in the estimation of 2018 NONROAD emissions.

[113] See http://www.weatherforyou.com/
[114] This was confirmed by Scott DiBiase at the PCAQCD.

Table 5-16 2008 NONROAD Emissions – Western Pinal County PM_{10} Nonattainment Area			
Equipment Category	Equipment Population	PM_{10} (tons/year)	PM_{10} (tons/day)
Agricultural	1,570	20.5	0.056
Airport Ground Support	0	0.0	0.000
Commercial	1,396	1.5	0.004
Construction and Mining	4,049	71.4	0.195
Industrial	261	2.5	0.007
Lawn and Garden	51,981	10.0	0.027
Logging	0	0.0	0.000
Recreational	13,985	15.5	0.042
Underground Mining	0	0.0	0.000
TOTAL	73,243	121.3	0.331

Table 5-17 2018 NONROAD Emissions – Western Pinal County PM_{10} Nonattainment Area			
Equipment Category	Equipment Population	PM_{10} (tons/year)	PM_{10} (tons/day)
Agricultural	1,570	20.5	0.056
Airport Ground Support	0	0.0	0.000
Commercial	1,722	1.8	0.005
Construction and Mining	4,996	87.8	0.240
Industrial	322	3.0	0.008
Lawn and Garden	64,129	12.8	0.034
Logging	0	0.0	0.000
Recreational	17,254	19.1	0.055
Underground Mining	0	0.0	0.000
TOTAL	90,360	144.4	0.396

5.1.6 Railroad Emissions

The daily PM_{10} emission factor and emission rates for estimating railroad operations are described in Section 3.1.1.7. The same emission factors are used in calculating the annual railroad emissions by assuming 2 trains travelling through the nonattainment area each hour, 366 days per year. Table 5-18 summarizes the length of track and the 2008 annual and typical daily emissions in the nonattainment area.

EPA most recently summarized emissions factors for locomotives in a 2008 study.[115] The 2018 PM_{10} emissions from each train passing the Cowtown monitor is 19.6 g/mi (vs. 37 g/mile in 2008) and occurs over 365 days (vs. 366 in 2008). All other assumptions for calculating 2018 railroad emission, such as the railroad length and the number of trains per hour, are held the same as 2008. Table 5-19 summarizes the 2018 annual and typical daily emissions in the nonattainment area.

Table 5-18
Summary of the 2008 Annual Emissions and Typical Daily Emissions for Railroads in Pinal County PM_{10} Nonattainment Area

Track Length in PM_{10} Nonattainment Area (miles)	Emission Factors (g/mile per train)	# of Trains (per hour)	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
120	37	2	86	470

Table 5-19
Summary of the 2008 Annual Emissions and Typical Daily Emissions for Railroads in Pinal County PM_{10} Nonattainment Area

Track Length in PM_{10} Nonattainment Area (miles)	Emission Factors (g/mile per train)	# of Trains (per hour)	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
120	19.6	2	45	249

[115] Emission Factors for Locomotives, EPA-420-F-09-025, U.S. Environmental Protection, April 2009.

5.1.7 Construction Emissions

As discussed in Section 3.1.1.8, PCAQCD staff[116] reviewed building permits issued in late 2007 (4th quarter) and selected those that were most likely to continue into 2008. These were combined with permits issued in 2008 to create a shape file of polygons identifying the location of each of the issued permits. A total of 2,668 construction plots were identified in the PM_{10} nonattainment area in 2008. The following information was provided by PCAQCD for each site:

- Permit type;
- Site location coordinates; and
- Acreage.

Three types of permits were found in the data provided:

- 5 – Construction;
- 7 – Commercial Construction; and
- 8 – Site Development.

Discussions with PCAQCD staff confirmed that Type 5 permits represented residential construction and Type 7 represented commercial construction (as listed); Type 8 was assumed to represent commercial construction and accounted for 2% of the issued permits.

The methodology used by Maricopa County to estimate the 2008 PEI[117] was used to estimate emissions for each project determined to be active on the design day. Annual emissions for each construction project were calculated by multiplying the number of acres by an emission factor that varies by project type (in units of tons/acre-month as shown in Table 5-20) by the average duration for a project type. The typical daily emissions were calculated by dividing the emissions by the number of work days per month (22 days per month), and by the average duration of a project type.

ADEQ calculated 23% control effectiveness for Pinal County's current construction rule (reviewed in section 3.1.1.8.). The number of precipitation days in 2008 was also used to adjust the annual emissions by multiplying a factor of (1-P/N), where P = annual number of "wet" days with at least 0.254 mm (0.01 in) of precipitation (31 days[118] in 2008), and N = annual number of days (366 days in 2008, 365 in 2018).

Table 5-20 summarizes the number of construction sites located within the nonattainment area, the emission factors, construction acreage by project type, the annual emissions, and the annual-average-day construction 2008 PM_{10} emissions in the nonattainment area.

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[116] Email from Kate Edwards, Pinal County to Bob Dulla, Sierra Research, 2008 Construction Dust Permits, November 28, 2012.
[117] 2008 PM_{10} Periodic Emissions Inventory for the Maricopa County, Arizona, Nonattainment Area, Maricopa County Air Quality Department
[118] 2008 precipitation data was obtained from the AZMET station located in the City of Maricopa.

The steps used to develop factors projecting 2008 construction emissions to 2018 for the stagnation modeling domain are described below.

- The county recorded the number of permits issued in the Pinal County nonattainment area through 2013 (see Table 5-21 below). The ratio of the number of dust permits issued in 2008 and 2013 was used to project construction emissions from 2008 to 2013.

- The ratio of county population growth between 2013 and 2018 (also shown in the table below) was used to adjust the construction emissions from 2013 to 2018.

The factors used to adjust the 2008 construction emissions to 2018 are calculated below.

- Construction projection factor from 2008 to 2013: 363/633 = 0.573
- Construction projection factor from 2013 to 2018: 441,890/394,066 = 1.12
- Overall construction projection factor from 2008 to 2018: 0.573*1.12 = 0.643

While road construction emissions were not calculated for the 2008 inventory due to a lack of complete data, 2018 road construction projects currently planned by local public works departments and regional planning organizations were accounted for in the calculation of total construction emissions for 2018. ADEQ utilized road improvement project information in order to estimate a total expected mileage of road construction for 2018. Individual road projects reported by local public works departments were analyzed for their earthmoving potential. Those projects expected to produce minimal to no earthmoving were assigned an emission factor of 0 tons/acre-month. Projects with some earthmoving activities were assigned an emission factor of 0.27 tons/acre-month. Those

Table 5-20
Summary of 2008 Construction Project, Annual Emissions, and Annual-Average-Day Construction PM10 Emissions by Project Type

Project Type	Project Duration (Months)	Total Area (Acres)	Emission Factor (Tons PM_{10}/ Acre-Month)	Annual Emissions (Tons PM_{10}/ Year)	Number of Working Days[a] (Days/year)	Typical Daily Emissions (lbs/day)
Residential Single Family	6	4,728	0.032	641	264	4,853
Commercial	11	2,429	0.27	5,092	264	38,575
Site Development	11	3,446	0.27	7,223	264	54,719
Total	N/A	10,603	N/A	12,955	N/A	98,146

a. The total number of working days per year was assumed to be 22 days/month times 12 months/year (i.e., 264 days/year).

Table 5-21 Data used to Project Pinal PM_{10} Nonattainment Area Construction Activity from 2008 to 2018			
Year	Dust Permits Issued in Pinal PM_{10} Nonattainment Area	Year	Population in Pinal County
2008	**633**	2013	**394,066**
2009	444	2014	400,210
2010	360	2015	408,757
2011	287	2016	418,920
2012	364	2017	430,263
2013	**363**	2018	**441,890**

projects that require extensive earthmoving were assigned an earthmoving emission factor of 0.42 tons/acre-month.[119] The total planned mileage of projects for 2018 are listed in Table 5-22 with the assigned emission factor based on project type.

In addition to currently planned road improvement projects, the implementation of the new Pinal County Fugitive Dust Rule in January of 2016 will require the control of at least 15 miles of unpaved roads with greater than 150+ ADT each year beginning in 2016. ADEQ reviewed projects currently planned for 2018 and estimated that a total 1.13 miles of these projects could be credited towards the Fugitive Dust Rule requirement of 15 miles. This leaves an additional 13.9 miles of roadway which must be controlled in order to meet the Fugitive Dust Rule requirements. ADEQ reviewed all Fugitive Dust Rule compliant projects between 2016 and 2018 and determined, based on the degree of earthmoving that would need to occur to complete the project, that the average emission factor for these projects was 0.233 tons/acre-month. Therefore, the assumed emission factor for the 13.9 additional miles of road improvement projects required to meet the Fugitive Dust Rule requirement for 2018 was 0.233 tons/acre-month. Furthermore, ADEQ additionally scaled total road construction emissions by 191.4%. The scaling was performed in order to provide an emissions cushion for the Motor Vehicle Emission Budget (MVEB).

Table 5-23 summarizes the number of construction sites located within the nonattainment area, the emission factors, construction acreage by project type, the annual emissions, and the annual-average-day construction 2018 PM_{10} emissions in the nonattainment area.

[119] Consistent with the largest construction emission factor reported in the WRAP Fugitive Dust Handbook (http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf).

Table 5-22 Road Construction Projects planned in 2018	
Emission Factor (tons/acre-month)	Project Miles
0.00	12.5
0.27	11.5
0.42	14.1

Table 5-23
Summary of 2018 Construction Project, Annual Emissions, and Annual-Average-Day Construction PM_{10} Emissions by Project Type

Project Type	Project Duration (Months)	Total Area (Acres)	Emission Factor (Tons PM_{10}/ Acre-Month)	Annual Emissions (Tons PM_{10}/ Year)	Number of Working Days[a] (Days/year)	Typical Daily Emissions (lbs/day)
Residential Single Family	6	3,040	0.032	412	264	3,121
Commercial	11	1,562	0.27	3,274	264	24,806
Site Development	11	2,216	0.27	4,645	264	35,187
Road Construction	12	-	-	168.8	365	289
Total	N/A	6,819	N/A	8,500	N/A	64,038

5.1.8 Emissions from Permitted Sources

PM_{10} annual emissions (tons/yr) for each permitted industrial facility in the nonattainment area were provided by the Pinal County Air Quality Control District (PCAQCD) from permit files. PCAQCD permits include estimates of PM_{10} emissions for stationary sources only. PM_{10} emissions from area sources such as unpaved road travel, livestock movement, and windblown dust were estimated separately and these separate methodologies are discussed in Section 3. Table 5-24 summarizes the annual emissions and annual-average-day emissions for these facilities assuming they are operating 366 days/yr.

The emission estimates calculated for the 2008 inventory were held constant for 2018.

Table 5-24 Summary of the 2008 Annual Emissions and Annual-Average-Day PM_{10} Emissions for Permitted Sources in the Western Pinal County Nonattainment Area		
Total Permitted Facilities	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
223	516	2,822

5.1.9 Dairy Emissions

Annual PM_{10} emissions for dairy operations in the nonattainment area in 2008 were derived from an emission factor published by the Arizona Governor's Agricultural BMP Committee[120] and estimates of average annual animal populations at affected dairies provided by United Dairymen of Arizona[121]. The published emission factor was reported to represent annual-average-day conditions and, thus, no adjustment was needed to use this factor in the computation of annual PM_{10} emissions from individual dairies. This factor, 5.21 lb/head-year, was multiplied by the average annual animal population at each dairy to calculate annual PM_{10} emissions at each affected facility, and the annual emissions of all affected facilities were summed to compute annual PM_{10} emissions from this source category on an annual basis for 2008 and 2018. Tables 5-25 and 5-26 summarize the number of cows and their annual emissions for 2008 and 2018.

The emission estimates employed in the 2008 inventory were held constant for 2018.

Table 5-25 Summary of the 2008 Annual Emissions and Annual-Average-Day PM_{10} Emissions for Dairies in the Western Pinal County Nonattainment Area			
Total # Head in PM_{10} Nonattainment Area	Emission Factor (lbs/head/year)	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
71,624	5.21	187	1,020

[120] Agricultural Best Management Practices for Livestock Operations, As Adopted by the Governor's Agricultural Best Management Practices Committee on July 27, 2010.
[121] Mike Billotte, United Dairymen of Arizona, email to Lisa Tomczak ADEQ, June 11, 2013.

Table 5-26 Summary of the 2018 Annual Emissions and Annual-Average-Day PM_{10} Emissions for Dairies in the Western Pinal County Nonattainment Area			
Total # Head in PM_{10} Nonattainment Area	Emission Factor (lbs/head/year)	Annual Emissions (tons/yr)	Typical Daily Emissions (lbs/day)
70,644	5.21	184	1,006

5.1.10 Combustion Sources

Combustion emissions were calculated using the methodology outlined in section 3.1.1.11 and were held constant from 2008 to 2018.

5.1.11 Unpaved Parking

Unpaved Parking emissions were calculated using the methodology outlined in section 3.1.1.12 and were held constant from 2008 to 2018.

5.2 High Wind Emission Inventory

The methodology described in Section 3.1.2 was designed to quantify emissions for lands located within the high wind modeling domains during hours when hourly average wind speeds exceeded 12 mph. To quantify emissions over the entire nonattainment domain, an alternative method needed to be developed to estimate the hourly wind speeds impacting each land parcel over calendar year 2008. The preferred method selected for this purpose assigned each parcel to an area surrounding one of the six PM_{10} monitoring sites at which, or near to which, hourly meteorological data is recorded (i.e., Casa Grande, Combs School, Cowtown, Maricopa, Pinal County Housing, and Stanfield). The method used to assign a parcel to its nearest monitoring station involved computing the distance from the centroid of that parcel to each of the six monitors. Meteorological data collected at the monitor closest to the parcel was selected to represent meteorological conditions at the parcel in 2008.

The next step was to screen the hourly wind speeds throughout the year and select those hours in which the hourly-average speed exceeded 12 mph[122]. Unlike the high wind days, which were selected for having elevated winds during several consecutive hours, days with high wind episodes as short as one hour were found in the monitoring station records. The numbers of high wind hours, low wind hours, and total wind speed monitoring hours at each of the six stations in 2008 are presented in Table 5-27. This tabulation shows that the ratio of total high wind hours to total low hours varies from monitor to monitor and ranges from a low of 3.3% at Stanfield to a high of 9.7% at Casa Grande.

[122] ADEQ adjusted the wind measurements at each monitor to a standard height of 10 meters using methods described in Section 3. In the process of preparing these values, days with moisture levels exceeding 0.01 inches of rainfall were excluded from hourly counts.

As described in Section 3.1.2, hourly high wind emission factors during multi-hour high wind episodes were adjusted to account for the effects of delayed initialization of saltation and diminished particle supply. For those episodes that lasted less than 3 hour, maximum emission rate was assumed (i.e. no adjustment to emissions was made). Other adjustments outlined in Section 3.1.2 were also applied to the emission factors used to compute fugitive PM_{10} emitted from each land parcel in the nonattainment area during a high wind hour.

Table 5-27
Summary of Low and High Wind Hours in 2008 for the Western Pinal County PM_{10} Monitors

Monitors	Number of High Wind Hours	Number of Low Wind Hours	Total Number of Hours[a]
Cowtown	692	8,076	8,768
PCH	499	8,135	8,634
Stanfield	287	8,496	8,783
Casa Grande	852	7,932	8,784
Maricopa	588	8,180	8,768
Combs School	556	8,228	8,784

a. Missing data vary by monitor and influence the totals.

Agriculture – For agricultural windblown emissions, information was needed on the distribution of disturbance levels by crop type across the year. PCAQCD staff provided a spreadsheet for the 2008 crop calendar for Pinal County that breaks each month into three ten-day periods (0-10, 10-20 and 20-30). The calendar color codes each ten-day period for the following activities:

- Planting,
- Begin/end harvest,
- Most active harvest, and
- No activity.

Using the information in the calendar, each ten-day period was assumed to be 100% disturbed if it was coded for one of the first three activities noted above. The number of ten-day periods with 100% activity was summed for each crop, multiplied by 10 and the total was divided by 360 for each crop to calculate the percentage of days in the year that a field is considered disturbed. Stabilized soil was calculated similarly and was assumed to occur between the completion of the harvesting season and the beginning of the planting season. Between the end of the planting season and the beginning of the harvesting season, soils are assumed to have no windblown dust emissivity due to crop coverage and frequent watering during the growing season. A summary of the results for the crops identified in the 2007 Agricultural Census, which provided % crop acreage distribution for land under

cultivation within Pinal County, is presented below in Table 5-28.[123] Also presented in Table 5-28 is the crop distribution obtained from the 2007 Agricultural Census for Pinal County. It shows that cotton and forage account for 69% of the land under cultivation.

Estimates of the total agricultural acreage within the nonattainment area were obtained from the shapefiles supplied by ADEQ/PCAQD. The acreage under active cultivation was calculated after subtracting the share[124] of fallow land (3.02%) from the total. The crop distribution from the 2007 Agricultural Census, presented in Table 5-28, was used to determine the acreage for each of the crop categories. Emissions were then calculated for each crop type following Equation 1 (disturbed) and Equation 2 (stable) presented in Section 3.1.2. The crop-specific emission estimates were weighted in proportion to the disturbance/stable values presented in Table 5-28 to quantify annual windblown emissions for active crop lands within the nonattainment area. Emissions for fallow lands were calculated using Equations 1 and 2 (from Section 3.1.2). The emission estimates were weighted according to the 90%/10% undisturbed/disturbed estimate provided by PCAQCD staff. Total emissions were calculated by summing estimates from active agricultural crop lands and fallow lands.

Table 5-28
Annual Crop Distribution for Pinal County and Disturbance Levels Derived from 2007 Agricultural Census and 2008 Pinal County Crop Calendar

Crop Type	Crop Distribution	Disturbed	Undisturbed/Stable
Barley for Grain	5.9%	41.7%	33.3%
Corn for Grain	0.6%	47.2%	25.0%
Cotton	37.2%	58.3%	11.1%
Sorghum for Grain	5.2%	47.2%	33.3%
Wheat for Grain	9.7%	41.7%	33.3%
Field and Grass Seed	1.4%	83.3%	0.0%
Forage[a] – All Hay, Haylage, Silage & Green chop	32.2%	83.3%	0.0%
Vegetables – Total	4.8%	63.9%	36.1%

a. Includes alfalfa

CAFOs – Windblown PM_{10} emissions from CAFOs decreased between 2008 and 2018 due to closure of Maricopa Cattle Company and the Pinal Feeding East pens located near the Cowtown monitor. For windblown PM_{10} emissions estimations, these locations were assumed to transition from the CAFO land use to Cleared Areas.

Cleared Areas – Windblown PM_{10} emissions increased between 2008 and 2018 due to the closure of Maricopa Cattle Company and the Pinal Feeding East cattle pens. These land

[123] 3.02 percent of Fallow lands were considered in the calculation based on the Crop information we received from CRPC.
[124] The average calculated for the shapefiles provided CRPC.

uses were assumed to transition from CAFOs to Cleared Areas increasing the total acreage of Cleared Area in the nonattainment area.

Construction – The randomized process used to quantify high wind emissions presented in Section 3.1.2 for a specific day becomes quite complex for calculating annual emissions. Therefore simplifying, but conservative assumptions were employed. Construction sites were assumed to be active year-round. Uncontrolled construction site land disturbance to stabilized ratios were calculated for each construction permit type based on permit information of site area from PCAQCD permits and WRAP recommendations for active construction site sizes.[125] Estimated uncontrolled disturbance ratios for construction permit type are given in Table 5-29. Additionally, PCQCD currently has a construction rule requiring controls for construction sites that limits opacity to 20%. Since the control effectiveness of this rule is unknown, ADEQ assumed 50% (as consistent with recommendations in the WRAP Fugitive Dust Handbook). Assuming 50% emission reduction due to these controls, ADEQ calculated the controlled construction site disturbance ratios listed in Table 5-29.

Table 5-29
Construction Site Disturbance Ratios

	Uncontrolled Site Disturbance	Uncontrolled Site Stability	Controlled Site Disturbance	Controlled Site Stability
Residential	84%	16%	44%	56%
Site Development	91%	9%	48%	52%
Commercial	100%	0%	53%	47%

A summary of the total annual emissions estimated for each land use category during high wind hours in 2008 is presented in Table 5-30 (descriptions of each category are provided in Exhibit 11). It shows desert shrubland is estimated to account for more than half of the windblown dust emissions. Agricultural Cropland is estimated to account for almost 27% of the windblown dust emissions. These values reflect the dominance of these lands within the nonattainment area.

For the high wind modeling domain, the steps outlined below were used to project 2008 high wind construction emissions to 2018 high wind construction emissions.

- For the low wind hours during high wind days, the 2008 construction emissions were projected to 2018 using the projection factors described above.

- For the high wind hours, the 2008 windblown dust emissions were divided into two emission categories:

[125] http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

Windblown Construction Emissions: The size of the 2008 construction area for the windblown dust emissions is adjusted using the projection factor (0.643) described above, for the low wind construction emission projection.

Developed Urban Land Emissions: The 2008 land no longer under development (i.e., where construction is assumed to have been completed) is assumed to be developed urban land (i.e., 1 – 0.643). These calculations are detailed in Section 5.1.7.

Unpaved Roads - Numerous improvement projects were completed between 2008 and the end of 2018 that were determined to reduce activity and windblown dust emissions from unpaved roads. Based on the information provided by local public works departments and regional planning organizations, these projects were reviewed to determine whether they fell within the nonattainment area. Table 5-30 provides the total, nonattainment area-wide mileage of roadway treated by control and the windblown control efficiency estimated for these controls. Please refer to Appendix D, Section D5.2 for an explanation of control efficiencies.

Table 5-30
Summary of the Controlled Unpaved Public Roads Located Within the Nonattainment Area
2008 – 2018

Work Description	Total Mileage	Activity Control Efficiency (%)	Windblown Control Efficiency (%)
Chip/Double Chip Sealing	80.8	99.86%	55%
Shoulder Stabilization	12.1	46%	38%
Dust Palliatives	5.8	73%	46%
Graded & Watered	17.5	0%	0%
Paved[1]	8.9	99.86%	55%
Shoulder Paving	6.5	64%	45%

Summaries of the total annual emissions estimated for each land use category during high wind hours in 2008 and 2018 is presented in Tables 5-31 and 5-32, respectively.

Table 5-31
Summary of the 2008 Annual High Wind Emissions in Western Pinal County

Land Use ADEQ ID	Land Use Category	Emissions (Tons/Year)	Percentage
A	Developed Urban Lands	201	0.28%
B	Developed Rural Lands (low density residential)	1,960	2.69%
D	Unpaved Roads	4,689	6.44%
E	Cleared Areas	398	0.55%
F	Residential Construction	1,302	1.79%
G	Dairies	450	0.62%
G’	CAFOs	274	0.38%
H	Desert Shrubland	38,277	52.54%
I	Agricultural Croplands	19,510	26.78%
J	Commercial Construction	686	0.94%
K	Other	4,244	5.83%
L	Site Development	859	1.18%
	Total Emissions	72,849	100.00%

a. “Other” land includes land covered with water, mountain peaks, or other unidentifiable lands from aerial photography.

Table 5-32 Summary of the 2018 Annual High Wind Emissions in Western Pinal County			
Land Use ADEQ ID	Land Use Category	Emissions (Tons/Year)	Percentage
A	Developed Urban Lands	248	0.35%
B	Developed Rural Lands (low density residential)	1,960	2.73%
D	Unpaved Roads	4,653	6.48%
E	Cleared Areas	457	0.64%
F	Residential Construction	838	1.17%
G	Dairies	450	0.63%
G'	CAFOs	155	0.22%
H	Desert Shrubland	38,277	53.32%
I	Agricultural Croplands	19,510	27.18%
J	Commercial Construction	441	0.61%
K	Other [a]	4,244	5.91%
L	Site Development	552	0.77%
	Total Emissions	71,784	100.00%

a. "Other" land includes land covered with water, mountain peaks, or other unidentifiable lands from aerial photography.

5.3 Summary of Annual Emissions

5.3.1 2008 Emissions Summary

A summary of source specific contributions to the 2008 annual emissions inventory is presented below in Table 5-33. It shows that even though windblown hours occur less than 10% of the year, the emissions produced during that time is sufficient to account for over 52% of the annual inventory. Non-windblown emissions from unpaved roads are the next largest source accounting for 32% of the annual inventory. Collectively these two sources account for over 84% of annual emissions.

Table 5-33 Summary of the 2008 Annual PM_{10} Emissions in the Western Pinal County Nonattainment Area			
Source Category		PM_{10} Emissions	
		(Tons/Year)	% of Total
Agriculture	Harvesting	313	0.22%
	Tilling	2,540	1.83%
CAFOs		2,614	1.88%
Paved Road		1,181	0.85%
Unpaved Road		45,128	32.45%
Fuel Combustion		28	0.02%
Fires		20	0.01%
Open Burning		14	0.01%
Nonroad		121	0.09%
Railroad		86	0.06%
Construction		12,955	9.32%
Dairy		187	0.13%
Permitted Sources		781	0.56%
Unpaved Parking		252	0.18%
Sub-Total: Low Wind Emissions		66,220	47.62%
Windblown Emissions[a]		72,849	52.38%
Total Emissions		139,068	100.00%

a. Windblown emissions are resolved for the year 2008 in Table 5-31.

5.3.2 2018 Emissions Summary

A summary of source specific contributions to the 2018 annual emissions inventory is presented below in Table 5-34. Similar to 2008, windblown dust produced the largest share of the emissions, accounting for 54% of the annual inventory, and non-windblown emissions from unpaved roads are the next largest source, accounting for 34% of the annual inventory. Collectively these two sources account for over 88% of annual emissions.

Table 5-34 Summary of the 2018 Annual PM_{10} Emissions in the Western Pinal County Nonattainment Area			
Source Category		PM_{10} Emissions	
		(Tons/Year)	% of Total
Agriculture	Harvesting	313	0.24%
	Tilling	2,540	1.91%
CAFOs		1,621	1.22%
Paved Road		1,408	1.06%
Unpaved Road		45,105	33.98%
Fuel Combustion		35	0.03%
Fires		22	0.02%
Open Burning		17	0.01%
Nonroad		144	0.11%
Railroad		45	0.03%
Construction		8,500	6.40%
Dairy		184	0.14%
Permitted Sources		781	0.59%
Unpaved Parking		252	0.19%
Sub-Total: Low Wind Emissions		60,967	45.93%
Windblown Emissions[a]		71,784	54.07%
Total Emissions		132,752	100.00%

a. Windblown emissions are resolved for the year 2018 in Table 5-32.

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Appendix B:

Pinal County PM_{10} Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days

Exhibits

December 2015

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BI. Analysis of Unpaved Roads in the Pinal County PM10 Nonattainment Area

Analysis of Unpaved Roads in the Pinal County PM_{10} Nonattainment Area
Revised
Pinal County Air Quality Control District
2/10/2014

Introduction

Preparation of a Pinal County PM_{10} State Implementation Plan (SIP) requires a detailed inventory of all PM_{10} emission sources. Unpaved roads in Pinal County need to be evaluated as part of the emissions inventory. PM_{10} emissions from unpaved roads reflect roadway lengths, traffic volumes, traffic speed, surface moisture and surface silt loading.

Since management responsibility largely follows surface ownership and maintenance, this analysis attempts to define a roadway classification system. The analysis also posits suggested corresponding values for traffic volume ("average daily travel" or "ADT"), traffic speed, and surface silt content. Where traffic volumes vary markedly as a result of recurring seasonal activity, the analysis also posits suggested seasonal ADT levels.

GIS aerials photographs were reviewed and in-field "ground truthing" employed to assess roadway use and ownership. Based on that effort, roads were broken down into four categories: Agricultural apron roads (Ag roads), Publicly maintained roads (county/city maintained roads), Private roads, and Trails. Two sets of field tests were conducted to collect silt data for various roadway categories. The samples were sent to JBR Environmental Consultants (JBR, 2012) for laboratory analysis of moisture content and silt content. Figure BI-1 (attached) is a summary chart from the report. Map locations are shown in Figure BI-2.

Silt can be categorized in two ways: Silt Content or Silt Loading. Silt content is expressed as a weight fraction, namely as a percent of the weight of silt (soil passing a 200 mesh sieve) in a soil sample. Silt loading is expressed as mass per area, such as $200g/m^2$. In a sense, silt content is a shovel sample and silt loading is broomed samples. Silt that is available to become airborne is a function of the mechanical wear and tear and maintenance of a road base. Identical road bases can show markedly different soil loadings due to the amount and type of traffic (mechanical wear). Additional road data for Pinal County are available in a 2006 report prepared for Arizona Department of Transportation (ADOT) and Pinal County by DKS Associates (DKS, 2006). Figure BI-3, which is Page 3-8 of the report, is a summary of the Silt and Moisture Contents of the roads under study. The accompanying General Soil Map from the USDA Soil Conservation Service (Figure BI-4) shows the road locations in relation to the major soil basins. Five unpaved roads were characterized for silt content, moisture content, ADT and average vehicle speed in the study. It should be noted that silt content and silt loading is variable based on traffic loading and meteorological conditions (i.e. wind, precipitation) and is simply an estimate of conditions on the day that sampling occurred.

For the most part, surface moisture content is low (<8%).

A contractor—Traffic Research and Analysis, Inc. (Traffic Research)—was hired to collect traffic counts at selected representative locations on publicly maintained roadways in January 2013. A summary of the collected data was presented in a report from Kate Edwards: *Analysis of Unpaved Roads in the Pinal County PM10 Nonattainment Area*, dated 03/07/2013. More recently, Traffic Research was hired to collect hourly traffic counts and speeds in January 2014 at the same locations surveyed in 2013. This version of the report presents a summary of the collected 2013 and 2014 data and updates estimates of public road ADT and speed levels.

The collected public road data were compared to historic records of unpaved roadway traffic count data. The most recent traffic volume data were grouped according to volume and a series of five traffic loading categories defined.

This first analysis was compiled for modeling purposes. Suggested values contained herein are intended for use in short-term (24-hr) modeling and daily average calculations. On an annual basis, these short-term ADT values for ag roads may overstate actual activity. Further revisions/adjustments will be made pending additional review.

Agricultural Roads

In terms of miles of unpaved roads, ag roads are the most common in the county. Since ag roads are on private property for the most part, public access is restricted, thus limiting the amount of data that can be collected. Specific access was granted for a joint Pinal County Air Quality Control District (PCAQCD) / Arizona Department of Environmental Quality (ADEQ) study of soils on state land, which included some agricultural property. Two of the samples were from ag roads: one showed a silt content of 16.2%, the other a silt content of 35.1%, for an average silt content of 25.6%. In the 2008 Maricopa Co. PM_{10} Emissions Inventory, a value of 11.9% was used for unpaved agricultural roads.

Empirical observation suggests that vehicle traffic on ag roads falls into three categories: operations, inspections, and harvest. Operations include generally low-speed roadway transport of planting and tilling equipment and travel by operators setting and removing irrigation equipment. Inspection involves supervisory visits to growing operations, and often occurs at higher speeds. Harvest operations entail both slow-moving equipment and personal vehicles, as well as haul trucks traveling back and forth to the nearest paved arterial. Haul traffic typically involves higher speeds.

As for daily traffic counts, the Maricopa County 2008 PM_{10} Emissions Inventory report uses 49.5 VMT / 1,000 acres based on a study done in 2001. (Agricultural operations typically occur on fractions of 640 acre mile-square sections of land; that VMT value equates to about 32 VMT per section). The report, *Technical Support Document for Quantification of Agricultural Best Management Practices*, was prepared by URS and the Eastern Research Group for ADEQ. If a 1,000-acre parcel is laid out with 20-acre panels, two trips around each panel per day results in approximately 45 VMT. Thus, the 49.5 VMT / 1,000-acres factor equates to about 2 ADT and appears to be very plausible for normal, everyday business. Again, based on empirical observation, that traffic can be further divided into 1.5 ADT for planting, tilling, and irrigation

traffic, and 0.5 ADT for inspection operations. However, unpaved ag road traffic increases significantly during the harvest operations. VMT for harvest seasons needs to reflect the significant traffic increase during those harvest operations. For example, such an adjustment would logically be required for the design day of October 29, 2008.

Suggested inventory values:

- Silt content – 25.6% (Average from JBR and 2012 testing)
- Moisture content – 1.5% (Average from JBR and 2012 testing)
- Traffic volume (non-harvest operations) – 1.5 ADT @ 10 mph
- Traffic volume (inspection operations) – 0.5 ADT @ 25 mph
- Traffic volume (harvest operations) – 50 ADT @ 15 mph

Public Maintained Roads

Due to the rural nature of the county, many roads remained unpaved until the housing boom began in 2003. As subdivisions blossomed across the county in areas formerly used as farm fields, more roads were paved to provide access. However, a good many roads remain unpaved in the county and within municipal boundaries. The 1922 Declaration of Road for Pinal County gave the county right-of-way on section lines for most sections, townships, and ranges that are in the PM_{10} nonattainment area. Over time, some of these roads were annexed into cities and towns. Although a road may be in a county right-of-way, in some cases, the Right of Way (ROW) still does not fall within the county maintenance system. PCAQCD has done simple, daily average road counts throughout the county, usually based on a complaint. In January 2013 and January 2014, as part of the preparation for the emission inventory, Traffic Research was hired to collect counts that include 15-minute incremental traffic counts on 20 unpaved public roads over a 7-day period chosen by PCAQCD. A listing of the selected roads is presented below in Table BI-1. Locations are shown in Figure BI-5.

Table BI-1: Proposed Classification for Public Unpaved Roads

Road Name	Classification	Classification Criteria
Eleven Mile Corner Rd S of Phillips Rd	A	Dead end within 0.5 miles in any direction
Papago Rd E of Hidden Valley Rd	A	Dead end within 0.5 miles in any direction
Hidden Valley Rd N of Dune Shadow Rd	A	Dead end within 0.5 miles in any direction
Clemans Rd S of Martin Rd	A	Dead end within 0.5 miles in any direction
Hartman Rd N of Maricopa-CG Hwy	B	Rural access road
White & Parker S of Hwy 84	B	Rural access road
Green Reservoir Rd E of Tweedy Rd	B	Rural access road
Alsdorf Rd W of Toltec Hwy	B	Rural access road
Curry Rd S of Hwy 287	B	Rural access road
Cornman Rd E of Eleven Mile Corner Rd	B	Rural access road
Montgomery Rd N of Clayton Rd	C	Rural arterial road
Bartlett Rd W of Skousen Rd	C	Rural arterial road
Hash Knife Rd W of Schnepf Rd	C	Rural arterial road
Peters Rd E of Stanfield Rd	C	Rural arterial road
Storey Rd W of Sunshine Rd	D	Rural major arterial
Amarillo Valley Rd S of Barnes Rd	D	Rural major arterial
Peters Rd W of Bianco Rd	D	Rural major arterial
Thornton Rd S Hanna Rd	D	Rural major arterial
Cooper Rd N of Arizona Farms Rd	E	Urban arterial - to be paved in near future
Earley Rd E of Peart Rd	E	Urban arterial - to be paved in near future

Table BI-2 summarizes average ADTs observed at each road link in 2013 and 2014; also presented is the average speed observed over the 7-day period in 2014 at each of the selected road links. This information was used to calculate average ADT and speeds observed for each of the five categories (classification A – E) addressed in the field survey; the results are shown in Table BI-3.

Table BI-2: Average Daily Traffics (ADTs) and Vehicle Speed Observed at Public Unpaved

Road Name	ADT Observed In Jan. 2013[1]	ADT Observed In Jan. 2014[2]	Vehicle speed[3] (mph)	Classification
Eleven Mile Corner Rd S of Phillips Rd	17	14	31	A
Papago Rd E of Hidden Valley Rd	18	15	28	A
Hidden Valley Rd N of Dune Shadow Rd	25	21	22	A
Clemans Rd S of Martin Rd	54	37	33	A
Hartman Rd N of Maricopa-CG Hwy	72	55	39	B
White & Parker S of Hwy 84	81	79	40	B
Green Reservoir Rd E of Tweedy Rd	94	90	51	B
Alsdorf Rd W of Toltec Hwy	96	70	43	B
Curry Rd S of Hwy 287	97	118	42	B
Cornman Rd E of Eleven Mile Corner Rd	97	78	50	B
Montgomery Rd N of Clayton Rd	106	77	50	C
Bartlett Rd W of Skousen Rd	118	107	40	C
Hash Knife Rd W of Schnepf Rd	134	55	39	C
Peters Rd E of Stanfield Rd	148	32	23	C
Storey Rd W of Sunshine Rd	170	175	51	D
Amarillo Valley Rd S of Barnes Rd	177	73	48	D
Peters Rd W of Bianco Rd	188	142	41	D
Thornton Rd S Hanna Rd	208	163	48	D
Cooper Rd N of Arizona Farms Rd	358	211	37	E
Earley Rd E of Peart Rd	519	1117	43	E

1. The ADTs levels were observed during a traffic study from January 12, 2013 to January 19, 2013.
2. The ADTs levels were observed during a traffic study from January 10, 2014 to January 17, 2014.
3. The Vehicle Speed levels were observed during a traffic study from January 10, 2014 to January 17, 2014.

Table BI-3: Summary of Average Daily Traffics (ADTs) and Vehicle Speed Used for the Public Unpaved Roads Emission Inventory

Classification	Average ADTs	Vehicle Speed (mph)
A	25	29
B	86	44
C	97	37
D	162	47
E	551	40

The Classification Criteria listed above are a suggested way to label roads for emission inventory purposes only. For lack of definitive characterization, all section line roads are assumed to be county maintained roads if not located within another municipal boundary. This may overstate

the public road lengths and understate the private road lengths, but the data will be revised or adjusted if more detailed information is forthcoming,

Suggested inventory values:

- Silt content – 7.5 % (Average silt content from DKS, 2006 and JBR, 2012)
- Moisture content – < 1% (Average silt content from DKS, 2006 and JBR, 2012)
- Traffic volume (Class A roadways) – 25 ADT @ 29 mph
- Traffic volume (Class B roadways) – 86 ADT @ 44 mph
- Traffic volume (Class C roadways) – 97 ADT @ 37 mph
- Traffic volume (Class D roadways) –1 62 ADT @ 47 mph
- Traffic volume (Class E roadways) – 551 ADT @ 40 mph

The ADT values represent the numerical average of the class. The proposed speeds represent an estimated average speed for the class of road. The speed for the Class E roadways was taken from the ADOT/Pinal County report (DKS, 2006). See Figure BI-6. Roads with high traffic volumes typically have better maintenance, hence higher average speeds.

Private Dirt Roads

Private dirt roads can generally be attributed to two categories: canal roads and other non-public, regularly traveled unpaved roads. Non-canal roads may provide access to residences or places of business but are wholly owned by the property owners. An easement may have been given to the public and/or utilities for ingress/egress purposes. These roads may run from a hundred feet to several miles. Since they are not publicly owned roads, there are not many available data regarding ADT/VMT or silt content. They are simply established, and sometimes graded, out of the natural soil in place. Canal roads are constructed by the canal companies on both sides of their canals in order to do their business. Private dirt roads are often composed of native soil or material dredged from canals. Often times signs prohibit trespass but some trespass undoubtedly occurs. The Institute of Transportation Engineers (ITE) has developed a Trip Generation Report that contains ADT rates and ranges for residential, commercial, industrial and other categories. The residential standard of 10 ADT per dwelling unit is utilized in many SIPs and Emissions Inventories. Since there is no data for the private roads in the county, using the ITE residential trip value is the best option. As for canal roads, Doug Mason of the San Carlos Irrigation District suggested in 2011 that a reasonable number for ADT would be four, but acknowledged some areas get much more traffic from trespassers. Since canal roads run on each side of the canal, this is reflected in the ADT below. So for a principle canal road, there would be a total of 30 ADT in any given stretch.

Suggested inventory values:

- Silt content – *Based on NRCS major soil basin map characteristics*
- Moisture content - < 1%
- Traffic volume (non-irrigation roads) – 10 ADT/residence @ 25 mph (further investigation pending)
- Traffic volume (principal canal roads) – 15 ADT @ 25 mph

- Traffic volume (secondary canal roads) – 3 ADT @ 15 mph

Trails

In Pinal County there are many trails that crisscross the landscape. Most are shortcuts from place to place, developed by OHVs, animals, and vehicles. Other roads that have been classified as trails are pipeline ROWs that are not maintained but traversed periodically. When digitizing the Roads layer, not all shortcut trails were counted. If there were several trails within a quarter of a mile of each other, only one was digitized. In addition, long, unpaved driveways were also digitized as trails, since they have regular traffic (probably in excess of 2 ADT) over typically unstabilized ground. ADTs for trails will only be an approximation as most are on private ground, with localized traffic that is sporadic in nature. However, to account for the emissions, some numbers must be assigned.

Suggested inventory values:

- Silt content - *Based on NRCS major soil basin map characteristics*
- Moisture content - < 1%
- Traffic volume – 2 ADT @ 15 mph

Conclusion

These values reflect PCAQCD's best estimates, based on the data and analysis discussed above.

References

JBR, 2012. A report prepared by JBR Environmental Consultants, Inc. for Sierra Research dated December 5, 2012 Re: Moisture and Silt Analysis of Soil Samples Results.

DKS, 2006. Final Report, Identification of Emissions Sources for Pinal County. Prepared by DKS Associates for Pinal County.

Traffic Research, 2013. A tabulation of road counts prepared by Traffic Research & Analysis, Inc. for Sierra Research, dated January 22, 2013.

Traffic Research, 2014. A tabulation of road counts and speeds prepared by Traffic Research & Analysis, Inc. for Sierra Research, dated January 22, 2014.

JBR ENVIRONMENTAL CONSULTANTS, INC.
LABORATORY RESULTS

creating solutions for today's environment

PROJECT: Sierra Research Corporation

Sample ID	Sample Source	Moisture Content (%)	Silt Content (%)	Silt Content (grams)
ST-01	Desert Soil	3.07	17.9	239.5
ST-02	Maintained Dirt Road	0.41	7.9	85.9
ST-03	AG Road	0.84	16.2	162.0
ST-04	AG Field	1.93	10.6	108.6
EL-01	Vacant Land	2.05	22.7	305.7
EL-02	AG Field	2.45	23.9	405.3
EL-03	AG Road	2.26	35.1	494.0
EL-04	Maintained Dirt Road	0.68	15.7	194.0
PI-01	Desert Soil	1.70	18.9	262.2
Sample Site #1 (1)	Unpaved Road Fluff	N/A	16.1	65.2
Sample Site #1 (2)	Unpaved Road Fluff	N/A	18.0	57.3
Sample Site #2 (1)	AG Field	N/A	17.9	65.6
Sample Site #2 (2)	Fallow AG Field	N/A	17.9	62.9
Sample Site #3 (1)	Cloded Fallow AG Field	N/A	11.5	24.2
Sample Site #3 (2)	Cloded Fallow AG Field	N/A	15.1	30.4
Sample Site #4 (1)	Very Silty Road (Story)	N/A	28.5	91.5
Sample Site #4 (2)	Very Silty Road (Story)	N/A	24.4	86.2
PCH	Unknown	N/A	34.1	154.9
Florence	Unknown	N/A	23.0	100.5
Cowtown	Unknown	N/A	29.2	115.4
Average		**1.71**	**20.2**	

Figure BI-1: Laboratory Results from JBR Environmental Consultants, Inc.

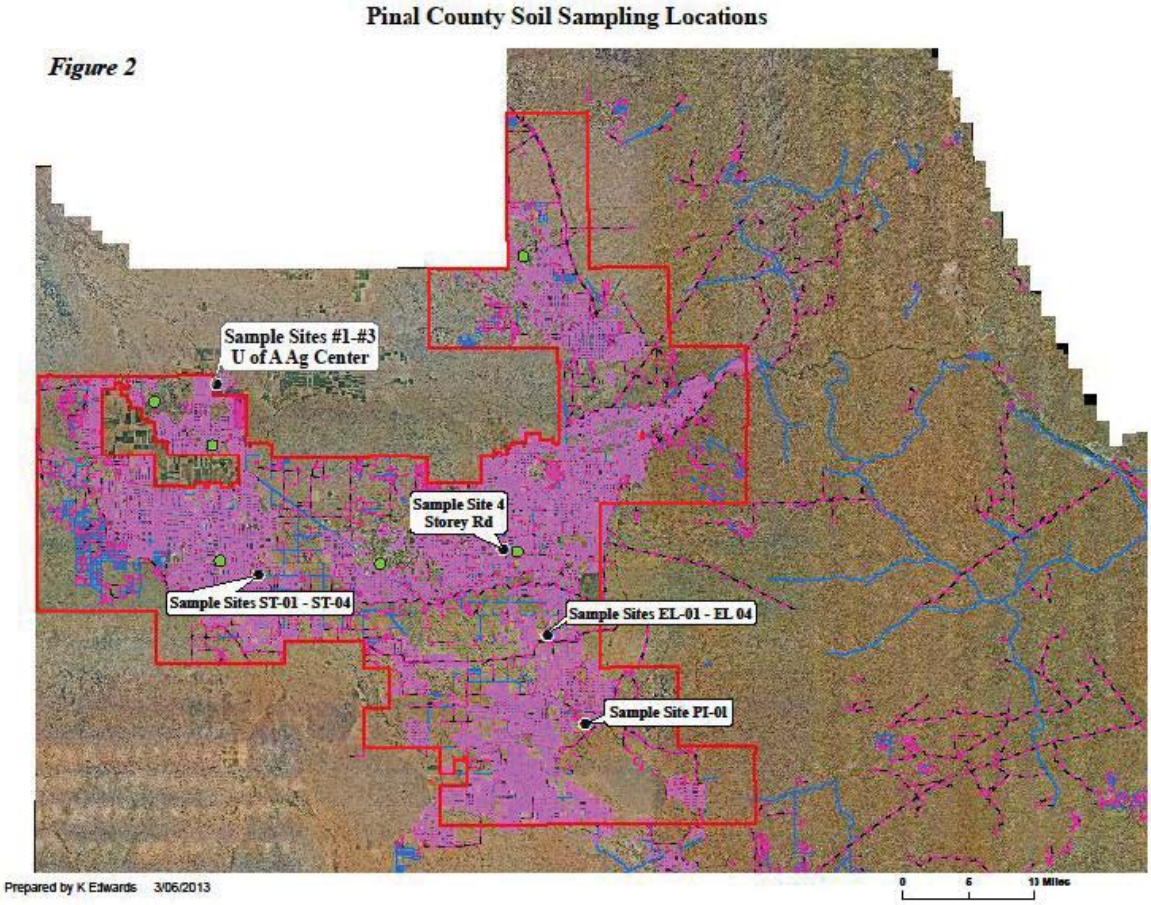
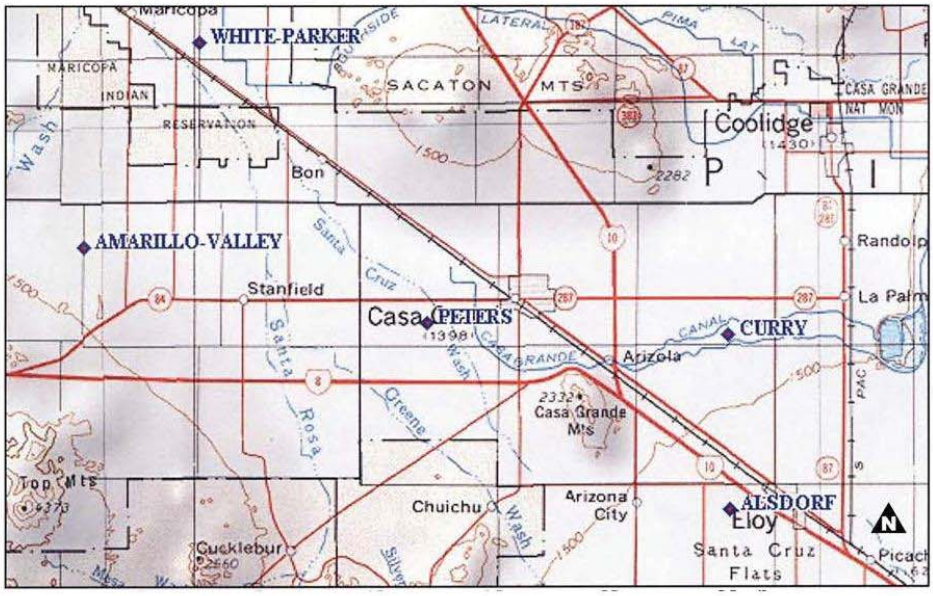


Figure BI-2 - Soil Sampling Locations in Pinal County

Figure 2: Locations of Unpaved Road Traffic Count and Soil Sampling Sites



PSI performed sieve and moisture content analyses on the shipped samples. For the first two samples collected (Alsdorf Road and Curry Road), these analyses were conducted within about one week of receipt by the laboratory. Because of personnel changes at the laboratory, however, the second set of samples collected (Amarillo Valley Road, Peters Road, and White & Parker Road) was not analyzed until about three weeks after receipt by PSI. Although the delay in analysis of the second set of samples could have allowed moisture in the soil to evaporate, the moisture contents of soil samples at the time of collection were undoubtedly very low, and the reported measurements indicate that moisture contents of the second set of samples were equivalent to or greater than those of the first set. For these reasons, we conclude that the delay in performing moisture content analyses of the second set of soil samples did not significantly affect the analytical results. The silt and moisture contents reported for each sample are listed in Table 3.

Table 3: Unpaved Road Surface Soil Silt and Moisture Content

Unpaved Road	Silt Content	Moisture Content
Alsdorf Road	2.60%	0.097%
Amarillo Valley Road	7.40%	0.106%
Curry Road	4.20%	0.154%
Peters Road	7.10%	0.306%
White & Parker Road	5.90%	0.477%

Figure BI-3 - Unpaved Road Surface Soil Silt and Moisture Content

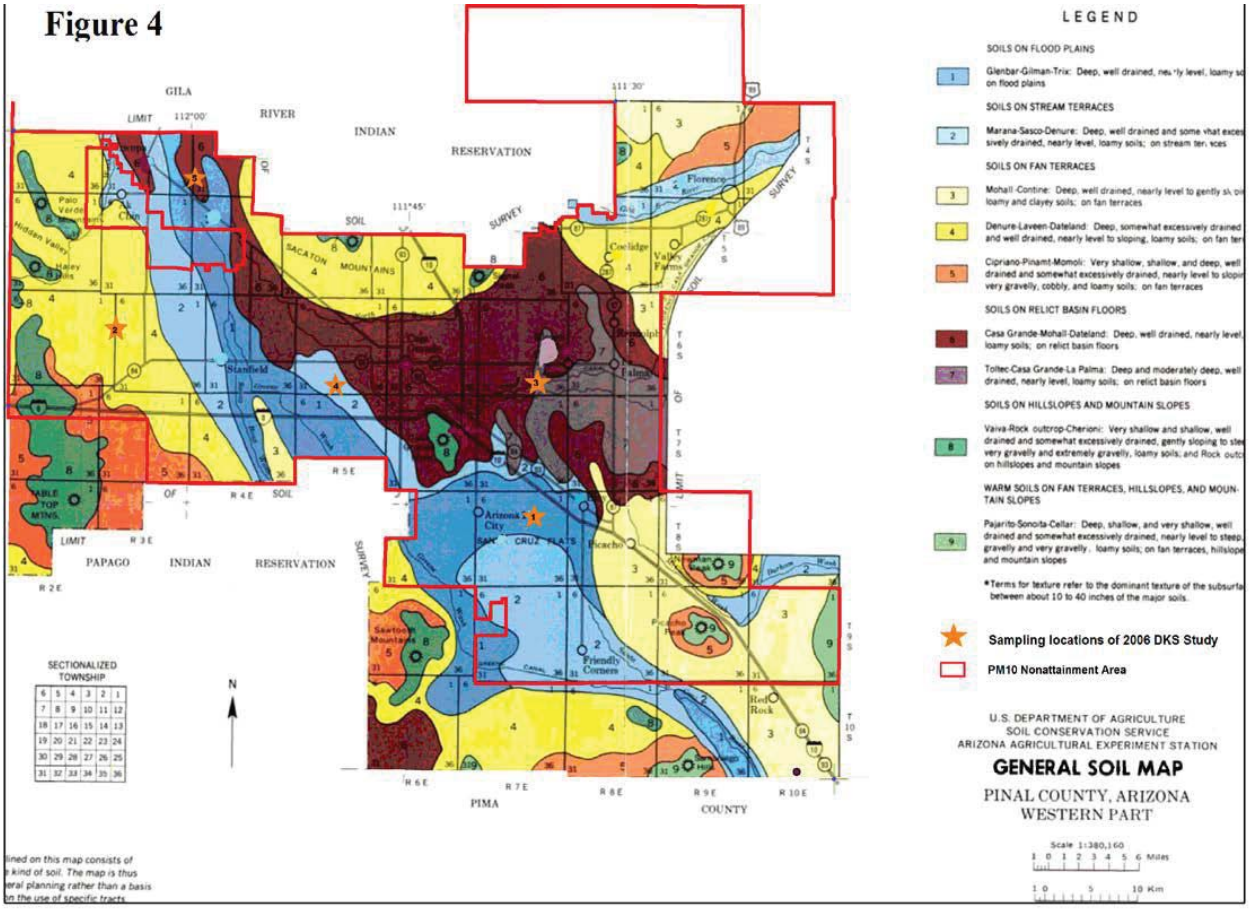
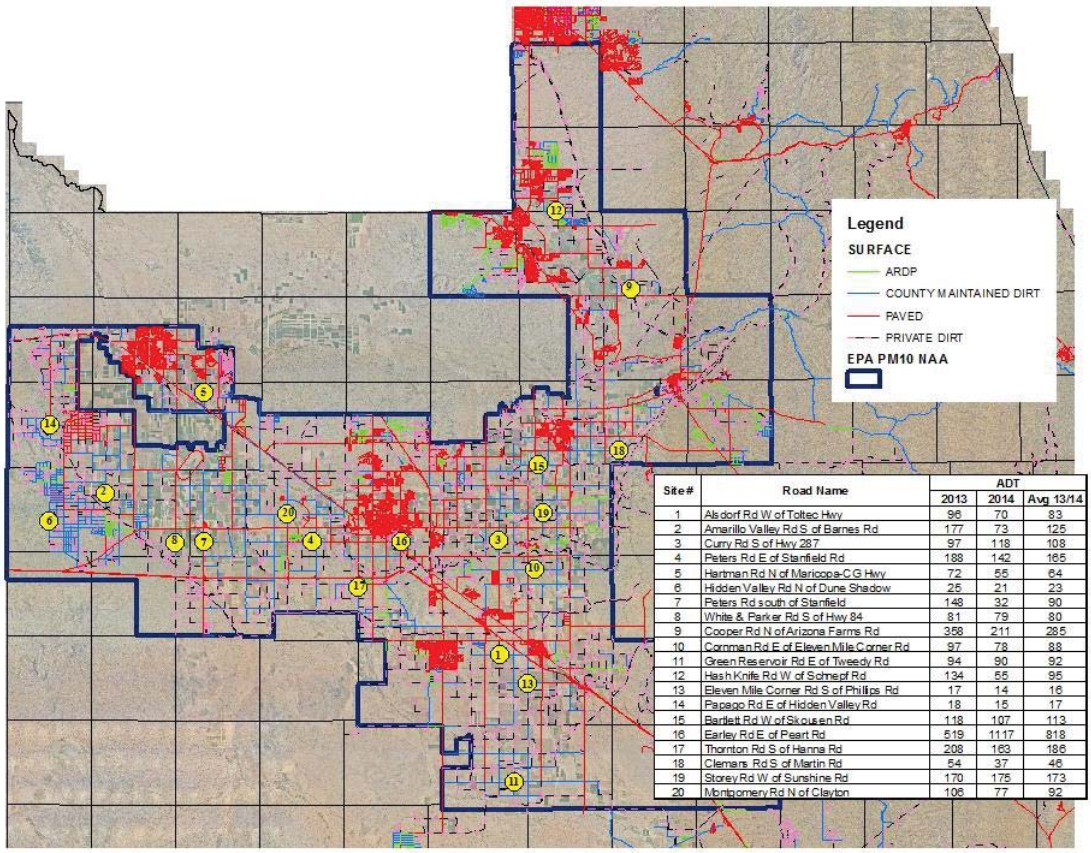


Figure BI-4 - West Pinal County General Soil Map

Pinal County Nonattainment Area Unpaved Road Counts



Site#	Road Name	ADT		
		2013	2014	Avg 13/14
1	Alsdorf Rd W of Toltec Hwy	96	70	83
2	Amarillo Valley Rd S of Barnes Rd	177	73	125
3	Curry Rd S of Hwy 287	97	118	108
4	Peters Rd E of Stanfield Rd	188	142	165
5	Hartman Rd N of Maricopa-CG Hwy	72	55	64
6	Hidden Valley Rd N of Dune Shadow	25	21	23
7	Peters Rd south of Stanfield	148	32	90
8	White & Parker Rd S of Hwy 84	81	79	80
9	Cooper Rd N of Arizona Farms Rd	358	211	285
10	Corrman Rd E of Eleven Mile Corner Rd	97	78	88
11	Green Reservoir Rd E of Tweedy Rd	94	90	92
12	Hash Knife Rd W of Schnepf Rd	134	55	95
13	Eleven Mile Corner Rd S of Phillips Rd	17	14	16
14	Papago Rd E of Hidden Valley Rd	18	15	17
15	Bartlett Rd W of Sikousen Rd	118	107	113
16	Earley Rd E of Peart Rd	519	1117	818
17	Thornton Rd S of Hanna Rd	208	163	186
18	Clemens Rd S of Martin Rd	54	37	46
19	Storey Rd W of Sunshine Rd	170	175	173
20	Montgomery Rd N of Clayton	106	77	92

Prepared 1/29/13 KAE Updated 10/20/14

0 6 Miles

Figure BI-5 - Summary of Road Count Locations and ADTs

As the EPA emission factor equation for unpaved road travel also includes average vehicle speed as a variable, data on vehicle speeds were collected through the use of traffic counters. Traffic Research and Analysis, Inc. (TRA) of Phoenix, Arizona installed dual tube counters on each of the five unpaved road segments in late May 2005. Each of the counters was left in place for seven days except for the counter on Amarillo Valley Road. Due to a communication gap, the Pinal County Public Works Department graded the portion of this road where the counter was located, causing the counter to cease operation after four days. After being repaired, the counter completed a seven-day traffic count in the following week. The average vehicle speeds and average daily traffic counts for each unpaved road segment are presented in Table 4.

Table 4: Average Vehicle Speeds and Average Daily Traffic Counts

Unpaved Road	Average Vehicle Speed (mph)	Average Daily Traffic Count
Alsdorf Road	42.8	153
Amarillo Valley Road	40.7	174
Curry Road	40.5	646
Peters Road	34.1	252
White & Parker Road	40.5	118

Two other factors that are constants in the EPA equation, for the purpose of this spreadsheet tool, were derived from EPA estimates and local meteorological data. The factor "C" in the EPA equation represents PM_{10} emissions from vehicle travel that are not generated by travel over unpaved roads. These emissions include particulate matter emissions from the vehicle exhaust pipe, brake wear particles, and tire wear particles. Data reported in the EPA MOBILE6.2 mobile source emission factor model lists the total of these emissions for the average light duty vehicle to be 0.00016 pounds of PM_{10} per vehicle mile traveled. This factor is subtracted from the total emissions reported by roadside testing to isolate the contribution made by travel over unpaved soil surfaces. The factor "P" in the EPA equation represents the number of days per year when rainfall reduces unpaved road travel emissions to zero. Other research referenced in AP-42 indicates that this situation occurs on any day in which 0.01 inches or more of precipitation occurs. From long-term rainfall data collected at Stanfield and Casa Grande, as tabulated on a website maintained for the National Oceanographic and Atmospheric Administration by the Desert Research Institute,[6] the annual average number of precipitation days in the agricultural district is 30 days per year. The precipitation day adjustment factor is used to adjust annual average emission factors only. The maximum 24-hour PM_{10} impacts are assumed to occur on a day with no measurable rainfall.

[6] Average Number of Days With Measurable Precipitation, Arizona, Western Regional Climate Center, NOAA and DRI, http://www.wrcc.dri.edu/htmlfiles/az/az.01.html, accessed on August 22, 2005

Figure BI-6 - Average Vehicle Speeds and Average Daily Traffic Counts

BII. Pinal County Field Sampling and Analysis for the Silt Characterization of Unpaved Road Dust and Agricultural Soil

Pinal County Field Sampling and Analysis for the Silt Characterization of Unpaved Road Dust and Agricultural Soil

June 18th, 2013

FINAL REPORT

Arizona Department of

Environmental Quality

Purpose:

The primary purpose of this field investigation was to determine the silt content of soil samples taken from unpaved roads and secondarily, determine silt content from soil samples taken from agricultural fields. Silt content is an important variable in many emission factor equations. This investigation was a joint effort between Pinal County Air Quality Control District (PCAQCD), the Arizona Department of Environmental Quality Air Quality Division (ADEQ AQD), and local farmers from Pinal County. This study took place on Wednesday May 8, 2013, at four different general locations within the Pinal County PM_{10} Nonattainment Area. JBR Environmental Consultants analyzed samples for moisture and silt content at their laboratory in Tempe Arizona[1].

Methods and Equipment:

Materials:

- Sealed Plastic Bags
- Shovels
- Dust Pan
- Dust Brushes
- Duct Tape (Sealing)
- Chain of Custody Forms
- Measuring Tape

The road samples were taken following the basic procedure developed by the Environmental Protection Agency (EPA) and published as appendix C1 in the AP-42 Emission Factor Reference Guide[2]. JBR Environmental Consultants performed laboratory analysis of the samples following the:

- ASTM C-136 Laboratory Sieve Analysis for Silt Content
- ASTM D-2216 Laboratory Determination of Moisture Content of Soil and Rock by Mass

In all, 60 total samples were taken of four different sample types and from four geographically distinct locations within Pinal County.

Results:

The sample domain table was compiled from the chain of custody forms used during sample collection. A sample number, description, date, time, and latitudinal and longitudinal coordinates based on the WGS 84 Datum were used to identify each sample. Additionally, the square footage and sampling site specific notes were used to further qualify samples. The sample type refers to:

- $A = Agricultural\ Apron\ Road$

[1] JBR Environmental Consultants, 2013. Sierra Research – ADEQ Dust Study: Summary of Silt and Moisture Analyses of Soil Samples from Pinal County, Arizona, Collected on May 8th, 2013.
[2] Environmental Protection Agency (EPA), 1993. http://www.epa.gov/ttn/chief/ap42/appendix/app-c1.pdf

- $C = County\ Maintained\ Road$
- $F = Agricultural\ Field$
- $P = Privately\ Maintained\ Road$

Table BII-1 summarizes the sampling in a chronological fashion with the only sorting being the separation of the Agricultural Field Samples from the Road Samples.

Table BII-1: Sample Descriptions

Sample #	Description	Type	Date	Time	Coordinates	ft^2	Comments
R1.1	Ag Apron Rd	A	5/8/2013	9:45am	32°55'22.1N 111°29'05.2W	11.5	Appearance of Heavily traffic
R1.2	Ag Apron Rd	A	5/8/2013	10:05am	32°55'18.6N 111°29'05.3W	21.0	Appearance of Heavily traffic
R1.3	Ag Apron Rd	A	5/8/2013	10:15am	32°55'16.0N 111°29'05.5W	10.0	Appearance of Heavily traffic
R2.1	Ag Apron Rd	A	5/8/2013	10:25am	32°55'13.3N 111°29'03.4W	13.0	less loose soil, parallel to canal
R2.2	Ag Apron Rd	A	5/8/2013	10:25am	32°55'13.2N 111°28'57.6W	15.6	less loose soil, parallel to canal
R2.3	Ag Apron Rd	A	5/8/2013	10:35am	32°55'13.4N 111°28'53.8W	15.0	less loose soil, parallel to canal
R3.1	Fasttrack S.	P	5/8/2013	10:45am	32°55'20.9N 111°28'49.8W	13.6	
R3.2	Fasttrack S.	P	5/8/2013	10:50am	32°55'14.6N 111°28'49.8W	15.1	
R3.3	Fasttrack S.	P	5/8/2013	10:55am	32°55'06.1N 111°28'50.0W	15.1	
R4.1	Randolph Rd	C	5/8/2013	10:50am	32°55'22.99N 111°28'52.84W	9.3	large amount of loose soil
R4.2	Randolph Rd	C	5/8/2013	10:57am	32°55'23.13N 111°29'13.24W	10.5	large amount of loose soil
R4.3	Randolph Rd	C	5/8/2013	11:05am	32°55'22.81N 111°29'39.34W	8.5	large amount of loose soil
R5.1	Storey W.	C	5/8/2013	11:44am	32°53'39.5N 111°35'36.6W	13.8	
R5.2	Storey W.	C	5/8/2013	11:57am	32°53'39.5N 111°35'49.2W	13.1	
R5.3	Storey W.	C	5/8/2013	12:11pm	32°53'39.5N 111°35'23.7W	14.1	
R6.1	Curry Apron W.	A	5/8/2013	12:23pm	32°54'18.5N 111°35'35.9W	11.1	
R6.2	Curry Apron W.	A	5/8/2013	12:36pm	32°54'18.5N 111°35'50.6W	11.1	

Sample #	Description	Type	Date	Time	Coordinates	ft^2	Comments
R6.3	Curry Apron W.	A	5/8/2013	12:44pm	32°54'18.6N 111°36'01.9W	10.1	
R7.1	Russell Apron E.	A	5/8/2013	2:31pm	32°50'06.8N 111°54'50.2W	10.9	
R7.2	Russell Apron E.	A	5/8/2013	2:37pm	32°50'06.8N 111°54'31.4W	12.2	
R7.3	Russell Apron E.	A	5/8/2013	2:42pm	32°50'06.8N 111°54'24.7W	13.0	
R8.1	Louis Johnson W.	C	5/8/2013	3:34pm	32°56'23.2N 112°03'02.6W	11.7	
R8.2	Louis Johnson W.	C	5/8/2013	3:45pm	32°56'23.2N 112°03'10.2W	10.1	
R8.3	Louis Johnson W.	C	5/8/2013	3:52pm	32°56'23.0N 112°03'50.7W	8.1	
R9.1	Barnes	P	5/8/2013	3:58pm	32°55'48.5N 112°03'54.8W	10.4	parallel to R14, same road as R9 (not Barnes)
R9.2	Barnes	P	5/8/2013	4:03pm	32°55'48.8N 112°03'41.3W	10.8	parallel to R14, same road as R9 (not Barnes)
R9.3	Barnes	P	5/8/2013	4:11pm	32°55'48.5N 112°03'26.1W	10.0	parallel to R14, same road as R9 (not Barnes)
R10.1	Ag Apron (N of Storey)	A	5/8/2013	12:00pm	32°53'43.98N 111°35'34.83W	15.0	
R10.2	Ag Apron (N of Storey)	A	5/8/2013	12:20pm	32°54'07.50N 111°35'34.07W	14.5	
R10.3	Ag Apron (N of Storey)	A	5/8/2013	12:30pm	32°53'29.05N 111°35'33.89W	9.0	
R11.1	Kleck	C	5/8/2013	12:50pm	32°54'31.87N 111°35'17.24W	11.0	
R11.2	Kleck	C	5/8/2013	12:52pm	32°54'32.0N 111°35'34.8W	17.6	
R11.3	Kleck	C	5/8/2013	12:55pm	32°54'32.17N 111°36'09.51W	25.5	
R12.1	Russell Rd	C	5/8/2013	2:36pm	32°49'58.76N 111°54'42.95W	12.0	
R12.2	Russell Rd	C	5/8/2013	2:43pm	32°50'29.24N 111°54'42.96W	11.0	
R12.3	Russell Rd	C	5/8/2013	2:50pm	32°51'06.88N 111°54'43.25W	11.5	
R13.1	Private Rd (E of Russell)	P	5/8/2013	3:00pm	32°50'59.41N 111°54'39.80W	17.0	elevated road, little loose soil
R14.1	Ag Apron (S of Louis Johnson)	A	5/8/2013	3:45pm	32°56'20.62N 112°03'26.80W	10.0	evidence of recent grading

Sample #	Description	Type	Date	Time	Coordinates	ft^2	Comments
R14.2	Ag Apron (S of Louis Johnson)	A	5/8/2013	3:50pm	32°56'02.58N 112°03'26.68W	13.0	evidence of recent grading
R14.3	Ag Apron (S of Louis Johnson)	A	5/8/2013	3:58pm	32°55'52.10N 112°03'26.63W	12.5	evidence of recent grading
R15.1	Ag Apron (S of Louis Johnson)	A	5/8/2013	4:10pm	32°55'48.33N 112°03'07.35W	9.5	located between R9/R16 and crop field
R15.2	Ag Apron (S of Louis Johnson)	A	5/8/2013	4:25pm	32°55'48.49N 112°03'29.08W	11.0	located between R9/R16 and crop field
R15.3	Ag Apron (S of Louis Johnson)	A	5/8/2013	4:30pm	32°55'48.40N 112°03'41.08W	10.5	located between R9/R16 and crop field
R16.1	Ag Apron (S of Louis Johnson)	A	5/8/2013	4:15pm	32°55'48.80N 112°03'07.48W	13.0	parallel to R14, same road as R9
R20.1	Barnes 2	P	5/8/2013	4:30pm	32°55'22.5N 112°03'56.9W	8.6	
R20.2	Barnes 2	P	5/8/2013	4:37pm	32°55'22.5N 112°03'46.2W	9.0	
R20.3	Barnes 2	P	5/8/2013	4:42pm	32°55'22.6N 112°03'28.3W	9.0	
F1.1	Field Ag Apron	F	5/8/2013	9:55am	32°55'21.1N 111°29'05.0W	NA	inactive, previously cotton
F1.2	Field Ag Apron	F	5/8/2013	10:10am	32°55'18.6N 111°29'05.2W	NA	inactive, previously cotton
F1.3	Field Ag Apron	F	5/8/2013	10:15am	32°55'13.3N 111°29'05.4W	NA	inactive, previously cotton
F2.1	Field N of Storey	F	5/8/2013	12:10pm	32°53'45.58N 111°35'35.15W	NA	Active field
F2.2	Field N of Storey	F	5/8/2013	12:25pm	32°54'20.30N 111°35'34.26W	NA	Active field
F2.3	Field N of Storey	F	5/8/2013	12:35pm	32°54'29.02N 111°35'33.93W	NA	Active field
F3.1	Cotton Field	F	5/8/2013	4:40pm	32°55'22.25N 112°03'56.90W	NA	Active field
F3.2	Cotton Field	F	5/8/2013	4:45pm	32°55'22.02N 112°03'45.10W	NA	Active field
F3.3	Cotton Field	F	5/8/2013	4:50pm	32°55'22.10N 112°03'17.60W	NA	Active field

Tables BII-2 through BII-5 report soil/dust moisture and silt content values as determined from the laboratory analysis completed by JBR Environmental Consultants Inc. The tables are separated based on sampling type. This is the same sorting that was used in the analysis of the results.

Due to the time constraints, soil moisture analysis was conducted on a few random samples to assess the variability in soil moisture within sample types. The moisture content was then evaluated from these samples and it was determined that the variation in moisture content was minimal and did not necessitate additional analyses. The silt content values were determined for each sample and those results are presented in these tables as well. ADEQ AQD, PCAQCD, and JBR Environmental Consultants collected, processed and analyzed all of the samples in the same fashion following the methods described in the previous section.

Table BII-2: Agriculture Apron Road Moisture and Silt Content Percentages

Ag Apron Road Sample	Soil Moisture Content	Silt Content
R1.1		13.3
R1.2		3.9
R1.3	1	19
R2.1		14.5
R2.2		12.9
R2.3		15.8
R6.1		17.2
R6.2		17
R6.3		9.3
R7.1		6.9
R7.2	0.5	14.9
R7.3		12.9
R10.1		9.4
R10.2	0.6	4.3
R10.3	0.8	9.8
R14.1		22.6
R14.2		3
R14.3		9.4
R15.1		11.7
R15.2	1	32.9
R15.3	1	38.4
R16.1		7.3

Table BII-3: Private Unpaved Road Moisture and Silt Content Percentages

Private Road Sample	Moisture Content	Silt Content
R3.1		2.7
R3.2	0.2	12
R3.3		8.5
R9.1	0.2	11.7
R9.2	0.3	16.1
R9.3	0.4	19.9
R13.1		16.5
R20.1		17
R20.2	0.3	18.2
R20.3	0.4	21.2

Table BII-4: County Maintained Road Moisture and Silt Content Percentages

County Road Sample	Moisture Content	Silt Content
R4.1		6.6
R4.2		2.7
R4.3		4.7
R5.1	0.3	10.8
R5.2	0.3	3.1
R5.3	0.2	9.9
R8.1	0.2	9.5
R8.2	0.2	9.5
R8.3		6.7
R11.1		12
R11.2	0.3	10.5
R11.3		7.4
R12.1		1.2
R12.2		3.4
R12.3	0.4	8.1

Table BII-5: Agricultural Field Moisture and Silt Content Percentages

Field Sample	Moisture Content	Silt Content
F1.1		10.2
F1.2	1.9	12.7
F1.3		5.8
F2.1		13.5
F2.2	5.9	15.5
F2.3		1.1
F3.1		1
F3.2	1.4	32.1
F3.3		17.3

Analysis and Discussion:

ADEQ AQD completed a brief statistical analysis of the silt and soil moisture contents to determine the general tendencies and variability of the study results. The following boxplots and table illustrate and describe the results in a fashion that allows some conclusions to be made about the silt content of different unpaved road types and agricultural fields in Pinal County.

The moisture contents of the different sample types were generally comparable in the case of the agricultural fields. JBR only analyzed three agricultural field samples for moisture content (one from each field), resulting in a right-skewed distribution. The other sample types had a greater number of samples analyzed for moisture content, and in general exhibited more consistent moisture content percentages than the limited number of field samples.

Table BII-6: Statistical Analysis of the Four Sample Types

Type	Description	Mean Soil Moisture Content (%)	Soil Moisture Content SD	Mean Silt Content (%)	Silt Content SD
A	Agricultural Apron Road	0.8	0.2	13.9	8.7
C	County Maintained Road	0.3	0.1	7.1	3.4
P	Private Road	0.3	0.1	14.4	5.7
F	Agricultural Field	3.1	2.5	12.1	9.5

Private and county maintained roadways had lower average moisture contents than the Agriculture apron roads, which border irrigated agricultural fields. Additionally, the agricultural field samples exhibited greater average moisture content than all sample types. Additionally, the standard deviation indicates that the sample population variance of moisture content is greater for agricultural fields than it

is for unpaved road surfaces. This can be expected as different crop types will require different soil moisture contents.

JBR's laboratory performed a complete silt content analysis of all samples across sample types. The statistical tests and plots indicate that county maintained roads had the lowest average silt content, with privately maintained road, agricultural apron road and agricultural field samples having average silt content percentages between 12 and 15 percent. The county maintained roads also had the lowest variance in silt content, followed by privately maintained roads, agricultural apron roads, and agricultural fields respectively.

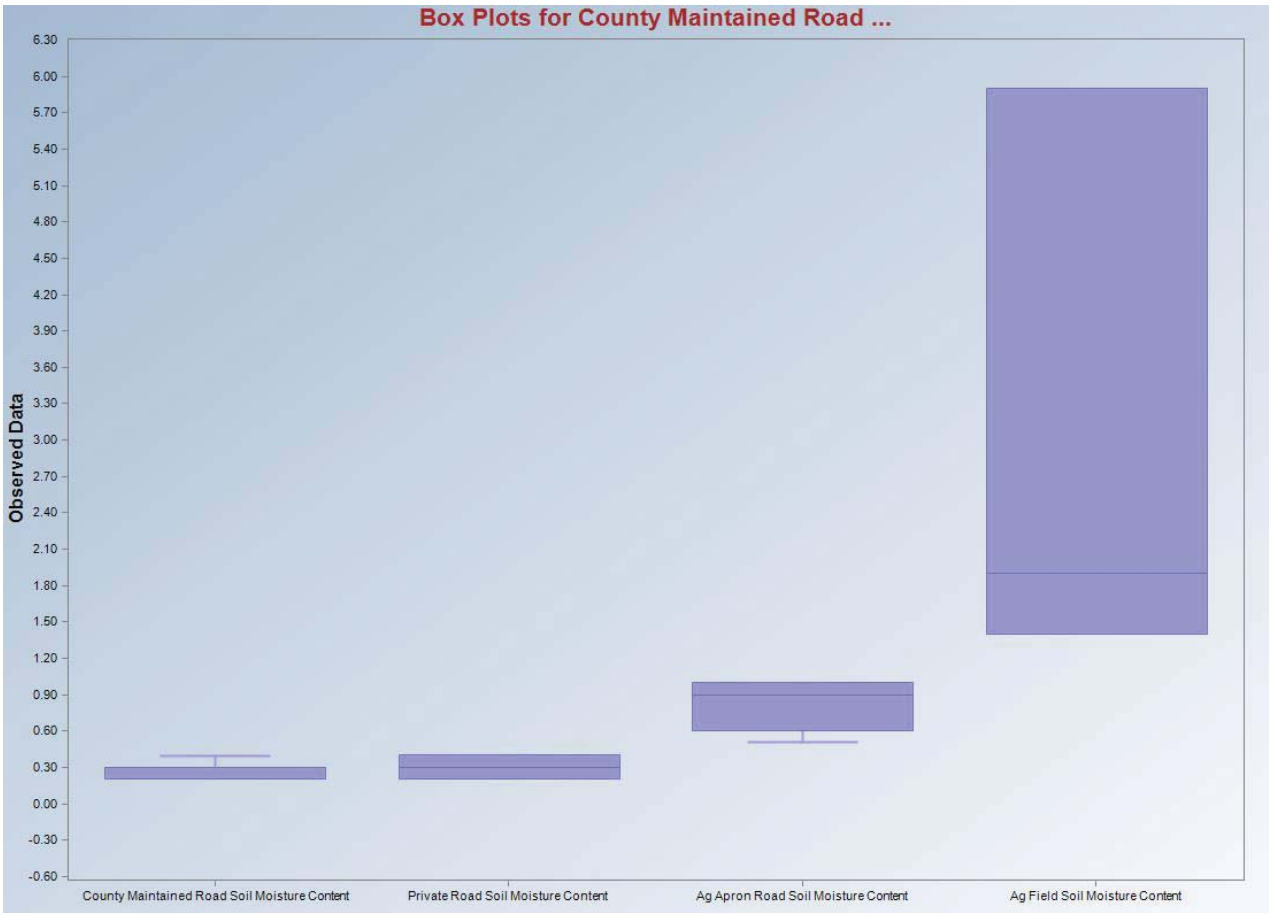


Figure BII-1: Soil Moisture Box Plot

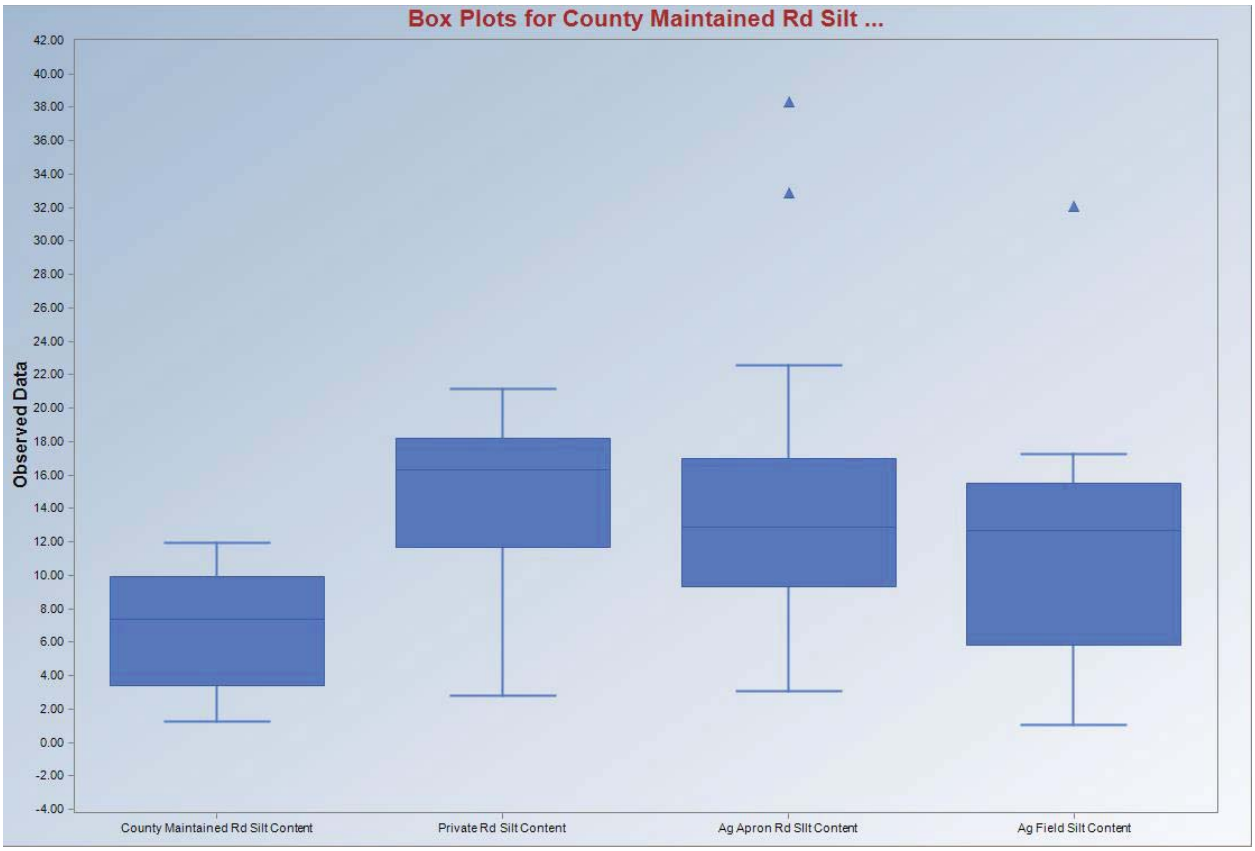


Figure BII-2: Silt Content

Pinal County Analysis:

PCAQCD expanded upon the analysis of Soil Samples taken on May 8, 2013 by computing the mean silt content per road sampled. Additionally, PCAQCD expanded the sample size by including soil sampling done on two previous dates[3]. ADEQ and PCAQCD analyzed silt content samples for unpaved agricultural apron roads, unpaved county maintained roads, and agricultural fields. Two samples were taken at each of these sites. ADOT also compiled silt content values for unpaved county maintained roads during sampling completed in June of 2005. The work done by PCAQCD summarizes the soil sampling data available from Pinal County since 2005.

In PCAQCD's analysis, sample averages from a given road or field were calculated to determine the mean silt content on both a total sample site basis and road/field basis. The **"site"** mean was the mean as calculated from all samples of the three data sets. The **"road"** was calculated by averaging samples on a given roadway/field to calculated a mean value of that individual roadway/field and then averaging the individual roadway/field means for a given road type/land use type to determine a road/land use type

[3] PCAQCD, 2013. Analysis of Unpaved Roads in the Pinal County PM10 Nonattainment Area.

mean silt content. The following table gives the mean of each different road/land use type sampled over the three sampling periods.

Table BII-7: Three Study Mean Silt Content Values

	Ag Apron Rd		**County Rd**		**Private Rd**		**Ag Fields**	
	Site	Road	Site	Road	Site	Road	Site	Road
Mean (%)	14.9	15.8	7.1	7.2	14.4	14.7	13.1	14.2

BIII. Pinal County Crops Calendar and High Wind Crop Disturbance Description

Table BIII-1: 2008 Pinal County Crop Calendar

Crop	Jan			Feb			Mar			Apr			May			June			July			Aug			Sept			Oct			Nov			Dec		
	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20	1	10	20
Cotton	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Corn	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0
Wheat	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Barley	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Alfalfa	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Sorghum	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0
Cantalope (Fall)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Cantalope (Summer)	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Watermelon	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Honeydew (Fall)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Honeydew (Spring)	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Broccoli	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Grapefruit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Navel Oranges & Misc.	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Pecans	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Planting Begin/End Harvest Most Active Harvest

Source: Pinal County Air Quality Control District

High Wind Design Crop Disturbance Levels

The crop disturbance levels were determined by combining information on monthly crop cultivation practices presented in the Crop Calendar, assumptions about vegetative coverage presented in Table 3-48 of the "Inventory Report," crops located within each modeling domain presented in Table 3-47, and comments from ADEQ presented in the "Technical Responsiveness Summary."[4] Presented below is a summary of how this information was used to characterize agricultural disturbance levels for each of the high wind modeling domains.

PCH – Table 3-47 shows that the dominant crops located within the modeling domain are cotton, alfalfa, and grain. According to the crop calendar, during the design day, 1/1/2008, cotton was being harvested. Table 3-48 shows that 70% of that land was 100% disturbed. Emissions for the cotton land were calculated using a 70% disturbance level. According to the Technical Responsiveness Summary, alfalfa and grain have a vegetative cover factor of 0.0, and therefore zero disturbance emissions.

CWT – Table 3-47 shows that the dominant crops are cotton, alfalfa, and orchards. According to the crop calendar, during this design day (4/27/2008), cotton was fully tilled, so it was assumed to 100% disturbed. Orchards and melons were still under cultivation, so no activity was assumed for these crops and their land was assumed to be 100% stable. Alfalfa was assumed to have zero emissions because it has a vegetative coverage factor of zero.

Maricopa – Table 3-47 shows that the dominant crops are alfalfa and corn, with a limited amount of cotton cultivation. According to the crop calendar, during this design day (10/27/2008), cotton was being harvested. Table 3-48 shows that 70% of that land was 100% disturbed. Emissions for the cotton land were calculated using a 70% disturbance level. While the Crop Calendar shows that corn was being harvested on this date, discussions and correspondence with Pinal county farmers found harvest activity on this date is primarily limited to alfalfa, cotton, and hay (where it is cultivated). For this reason, land with corn was assumed to be 100% stable. Alfalfa was assumed to have zero emissions because it has a vegetative coverage factor of zero.

STF – Table 3-47 shows that the dominant crops are cotton, alfalfa and corn. According to the crop calendar, during this design day (11/21/2008), cotton was being harvested. Table 3-48 shows that 70% of that land was 100% disturbed. Emissions for the cotton land were calculated using a 70% disturbance level. While the Crop Calendar shows that corn was being harvested on this date, discussions and correspondence with Pinal county farmers found harvest activity on this date is primarily limited to alfalfa, cotton and hay (where it is cultivated). For this reason, land with corn was assumed to be 100% stable. Alfalfa was assumed to have zero emissions because it has a vegetative coverage factor of zero.

[4] "Technical Responsiveness Summary" report sent from ADEQ

BIV. Traffic Counts (ADT levels) for the Unpaved Roads in Each of the Modeling Domain

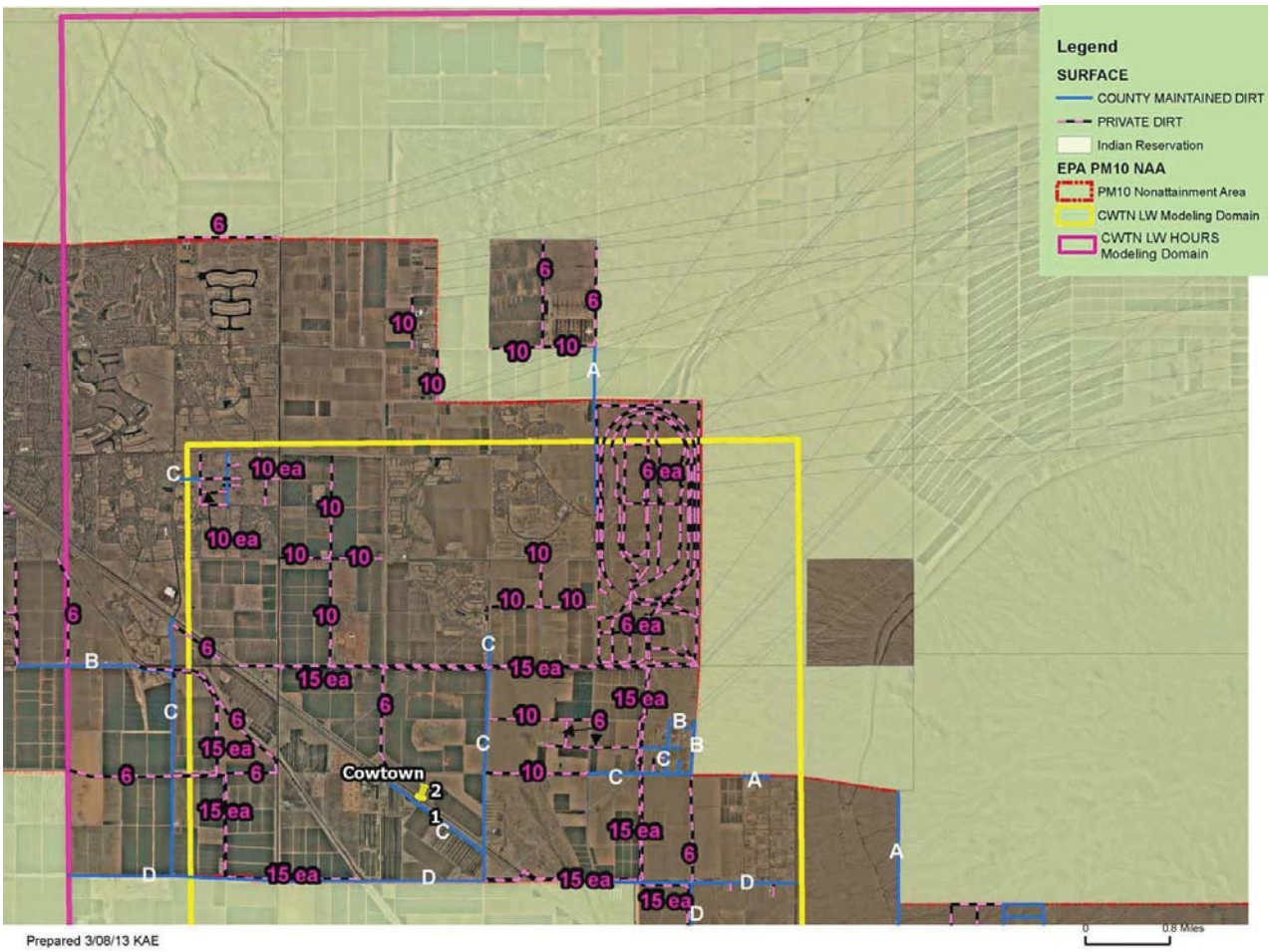


Figure BIV-1: ADTs of the Unpaved Roads for North Cowtown Stagnation Day and Low Wind Hour Modeling Domain

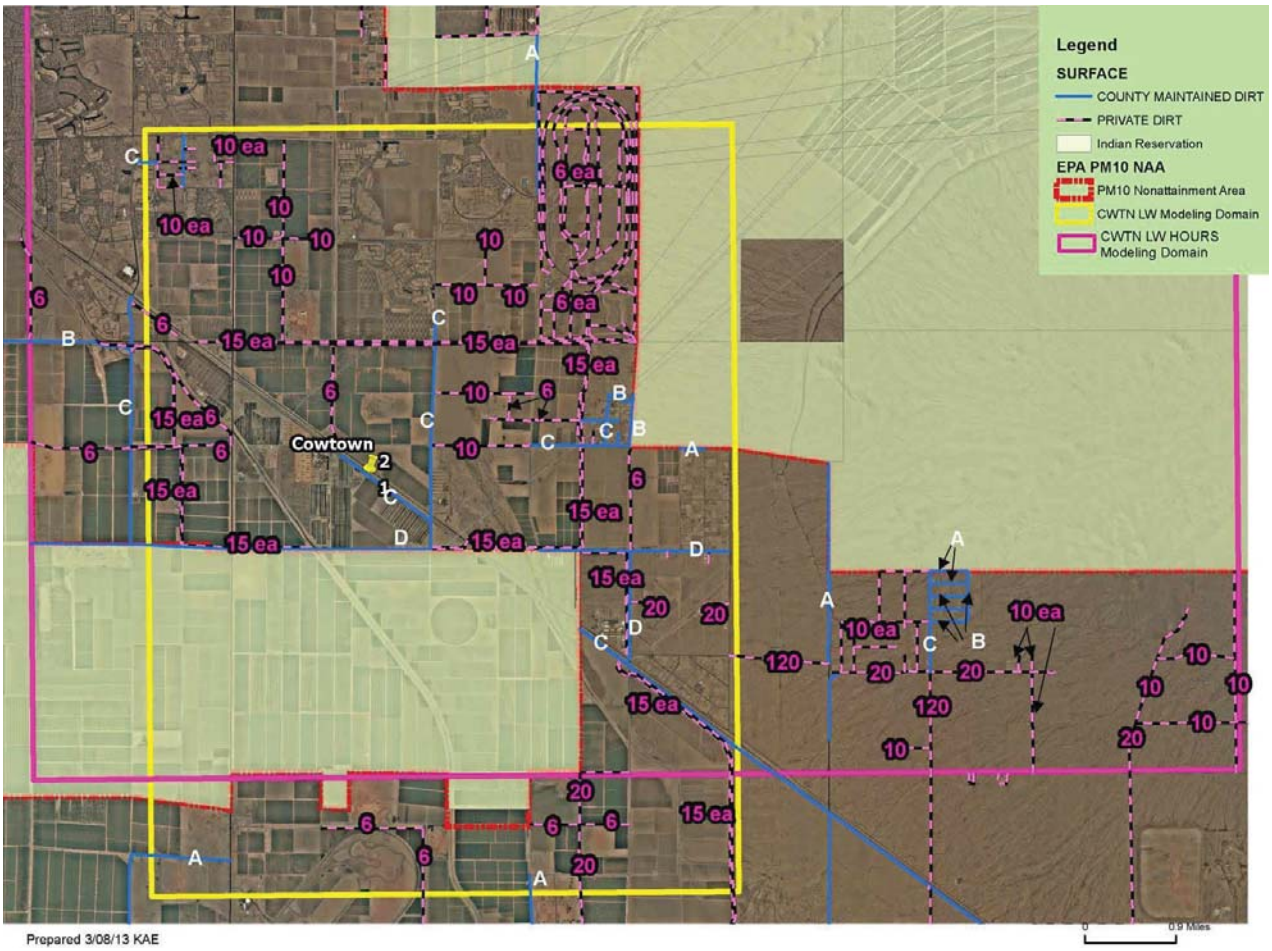


Figure BIV-2: ADTs of the Unpaved Roads for South Cowtown Stagnation Day and Low wind Hour Modeling Domain

Figure BIV-3: ADTs of the Unpaved Roads for Maricopa Low wind Hour Modeling Domain (Eastern half)

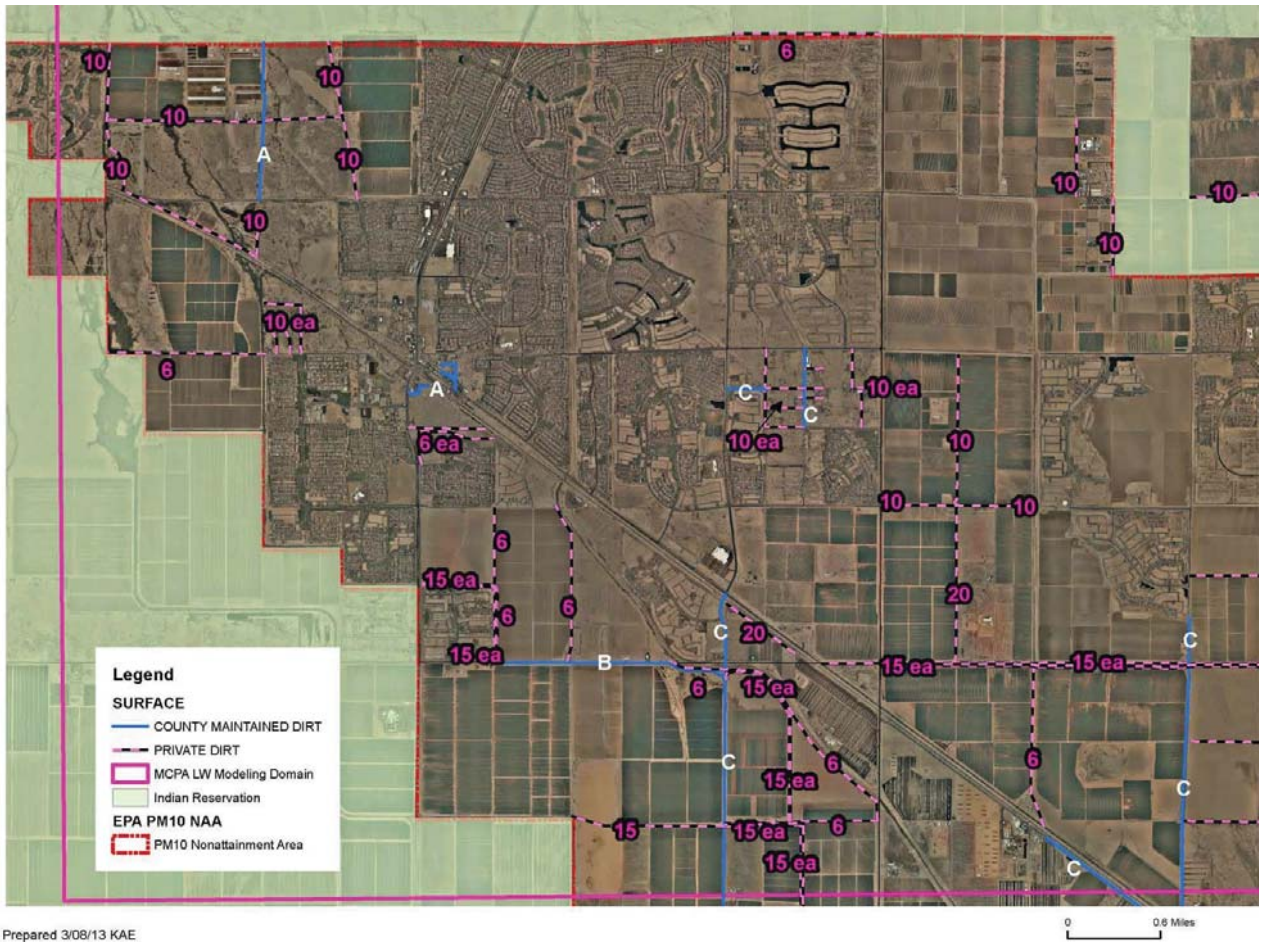


Figure BIV-4: ADTs of the Unpaved Roads for Maricopa Low wind Hour Modeling Domain (Western half)

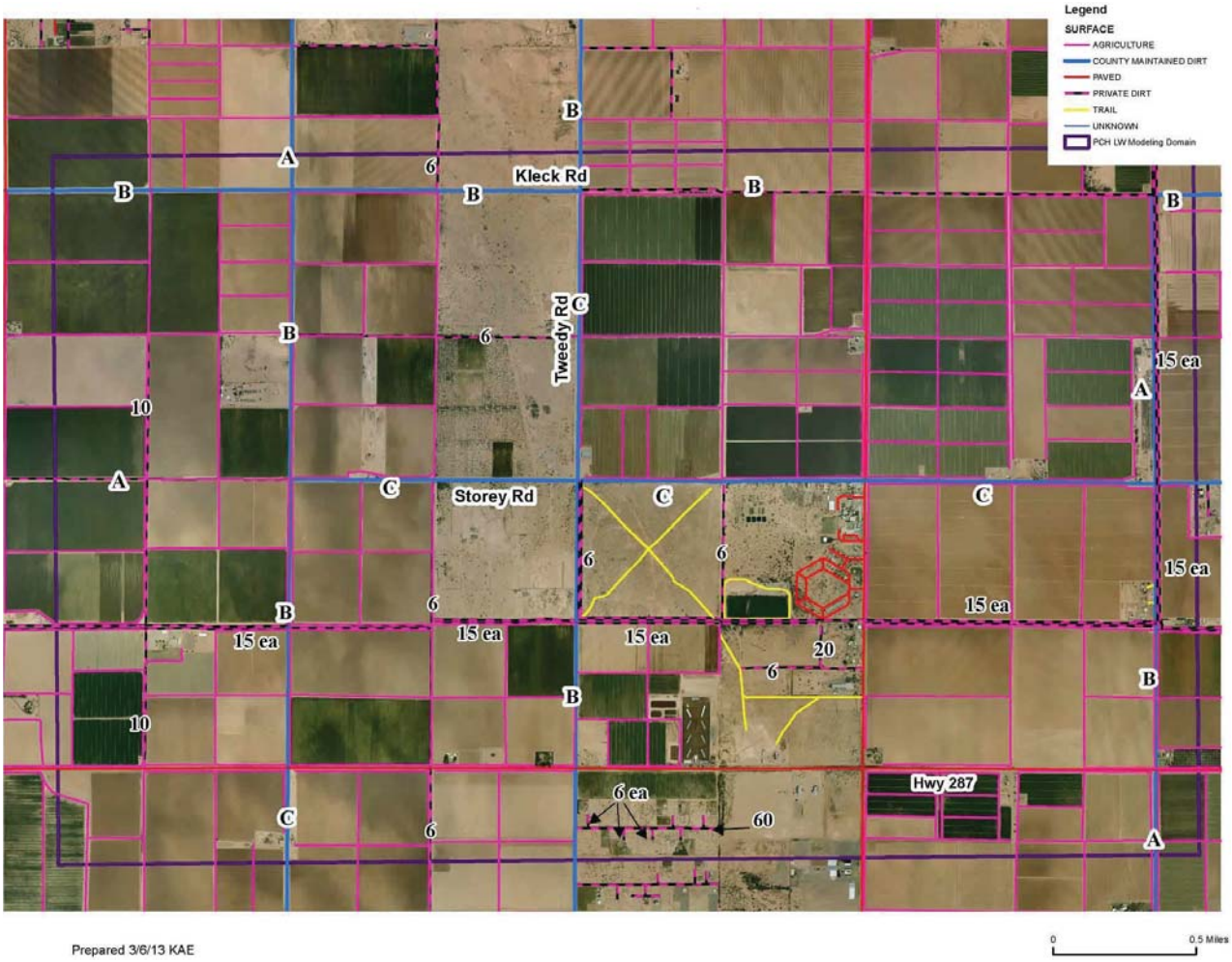


Figure BIV-5: ADTs of the Unpaved Roads for Pinal County Housing Stagnation Day Modeling Domain

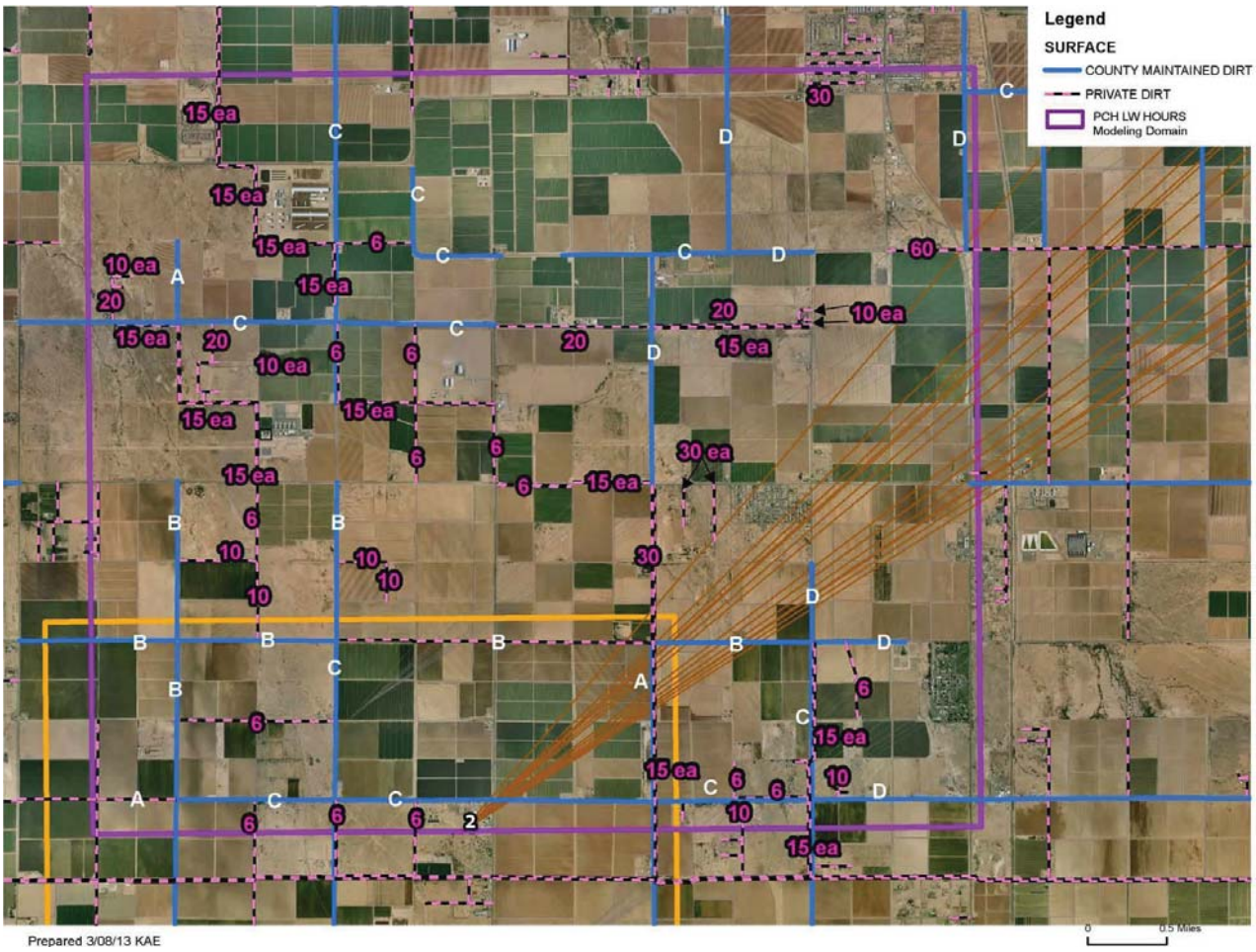


Figure BIV-6: ADTs of the Unpaved Roads for Pinal County Housing Low Wind Hour Modeling Domain

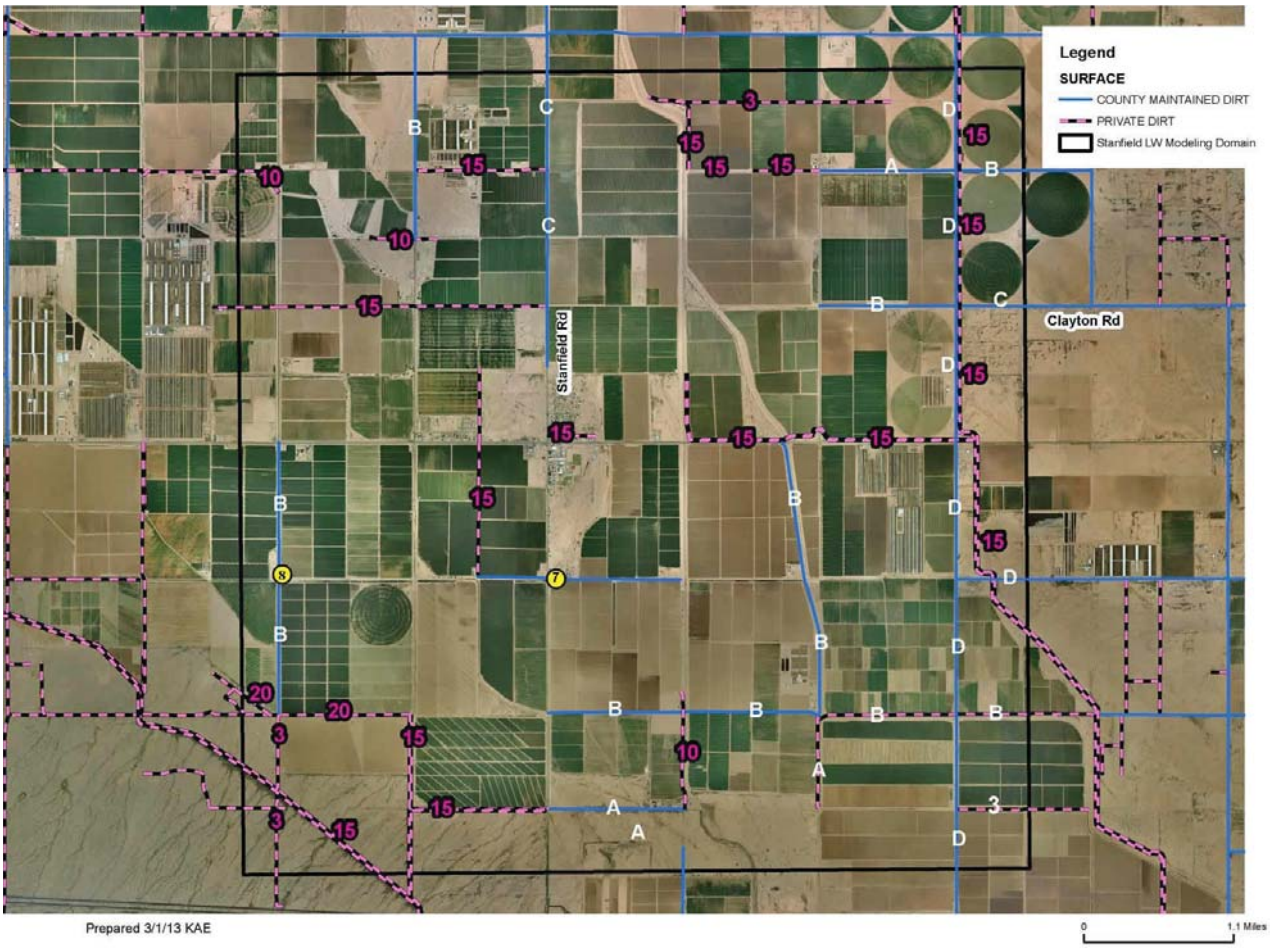


Figure BIV-7: ADTs of the Unpaved Roads for Stanfield Stagnation Day and Low Wind Hour (Western half) Modeling Domain

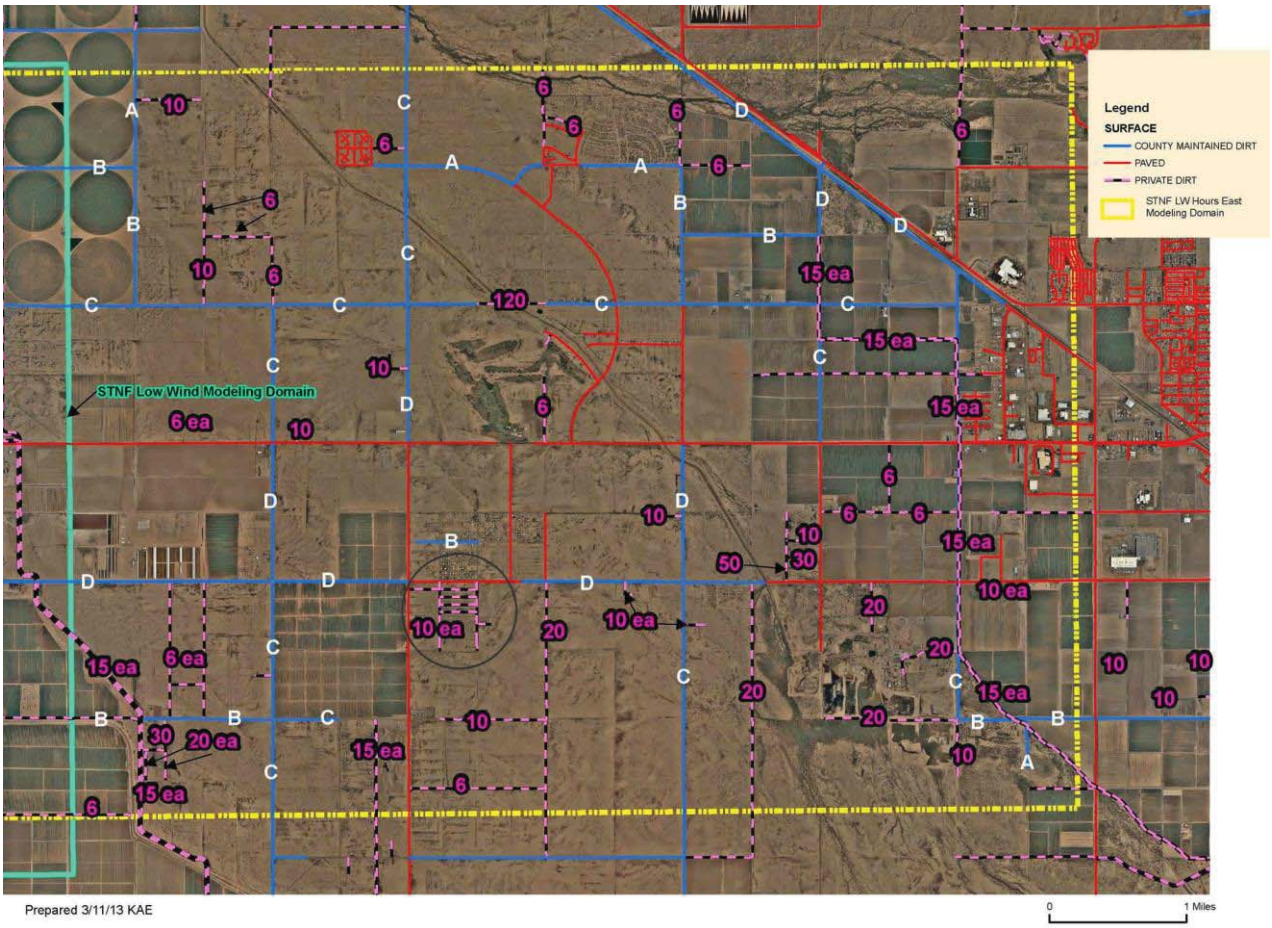


Figure BIV-8: ADTs of the Unpaved Roads for Low Wind Hour (Eastern half) Modeling Domain

BV. Methodology for Estimating Windblown Emission Factors within 1 MPH Wind Speed Bins

Methodology for Estimating Windblown Emission Factors within 1 MPH Wind Speed Bins

Maricopa Association of Governments' Approach

In the emission inventory for the Maricopa Association of Governments' (MAG) Five Percent PM_{10} Nonattainment Plan, windblown PM_{10} emissions were estimated on an annual basis for the base year of 2008. Because high wind emission rates are more closely correlated with very short-term wind gust velocities than with hourly average wind speeds, due to the power relationship between emission rates and wind speeds, MAG staff used average wind speeds measured over the shortest intervals reported by the Maricopa County Air Quality Department's continuous monitors, which were 5-minute averaging periods. Five-minute average wind speeds exceeding 12 mph—the threshold speed for dust entrainment determined by MAG on the basis of region-wide monitoring data—were extracted from the meteorological datasets and sorted into wind speed bins generally spanning 5 mph intervals. The wind speed bins were set at 12–15 mph, 15–20 mph, 20–25 mph, 25–30 mph, and 30–35 mph in order to develop disturbed soil emission factors within each wind speed bin. The upper limit of these bins was dictated by the highest 5-minute average wind speed recorded in the MAG PM10 nonattainment area in 2008.

Emission factors were computed for each wind speed bin on the basis of wind tunnel studies of exposed soils in Maricopa and Pinal Counties conducted by Nickling and Gillies.[5] MAG staff concluded from this study that emission factors for the soils categorized by land use type were sufficiently similar to each other as to allow for the use of a single composite emission factor to represent and be used to compute windblown emissions from all soils in the nonattainment area with the exception of those used for agricultural cultivation. The composite emission factor used in the Five Percent Plan for windblown PM_{10} from disturbed non-agricultural soils was $4.36 \times 10^{-15} u^{*4.3961}$ g/cm^2-sec, where u* was the friction velocity reported by Nickling and Gillies for all non-agricultural soils tested.

Since the Five Percent Plan emission inventory was designed to be an annual inventory, windblown PM_{10} emissions were computed on an annual basis. To do this, MAG staff first converted the wind speed representing the midpoint of each wind speed bin to an equivalent friction velocity using the Prandtl equation[6], and then computed the PM_{10} emission rate for winds within each speed bin from the bin-specific friction velocity using the composite Nickling and Gillies emission factor equation (above). Emission rates, in tons/acre-5 minute period, were multiplied by the total number of 5-minute periods in each speed bin and then summed over all speed bins to develop an annual emission rate for disturbed soils. The ratio of PM_{10} emissions measured in more recent wind tunnel testing near Barstow, California of disturbed and undisturbed soils was applied to the annual emission factor for disturbed soils to derive an annual emission factor for undisturbed soils in the MAG nonattainment area. Total annual windblown PM_{10} emissions in the Plan were then computed by multiplying these emissions factors by the total estimated areas of disturbed and undisturbed soils in the nonattainment area.

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[5] Evaluation of Aerosol Production Potential of Type Surfaces in Arizona, prepared for Engineering-Science by W.G. Nickling and J.A. Gillies, for EPA Contract No. 68-02-380, September 1986.

[6] The fluid dynamics Prandtl equation: $U = (u^*/k) \times \ln(z/z_0)$, where U is the wind speed measured at an amemometer z meters above the ground surface, u* is the friction velocity, k is the Von Karmen constant

Western Pinal County Modifications

In deriving windblown PM_{10} emission factors for the Pinal County PM_{10} design day emission inventories, Sierra used the basic MAG approach as this methodology was previously approved by EPA. Wind speed data reported as hourly averages have been recorded by the Pinal County Air Quality Control District (PCAQCD) for a number of years at each of the Pinal County Housing, Cowtown, and Stanfield monitoring stations for which attainment demonstrations are required. Only in more recent years have the meteorological dataloggers at these sites been programmed to record wind speed averages with 5-minute resolution, however. As a result, to match the MAG approach as best as possible, the available 5-minute high wind data were used to calculate equivalent hourly average emission factors with the same wind speed bins used by MAG, and these factors were then applied to hours on attainment demonstration design days when hourly average wind speeds were within the same speed bin.

The calculation of equivalent hourly emission factors from 5-minute emission factors was done by preparing histograms of 5-minute wind speeds within each hourly average wind speed bin. At each monitor, hourly wind speed data exceeding 12 mph were extracted from the recent year records and sorted into the same wind speed bins used by MAG. Then, the 5-minute average wind speed data recorded during all of the hours listed within a single hourly wind speed bin were extracted from the same database and also sorted into the same wind speed bin design. The numbers of 5-minute averages within each bin were totaled and used to populate the histogram of 5-minute wind speed periods within each hourly wind speed bin. An example table of this distribution for the Pinal County Housing site in 2012 is presented in Table BV-1.

Table BV-1: Distribution of 5-Minute Wind Speed Periods in Each Hourly Wind Speed Bin

Count of mph	Column Labels					
Row Labels	0.00	12.00	15.00	20.00	25.00	Grand Total
12.00	200	402	163	3		768
15.00	5	74	323	42		444
20.00			27	44	1	72
Grand Total	**205**	**476**	**513**	**89**	**1**	**1284**

In this example, for the hourly wind speed bin of 12–15 mph, approximately 26% (200/768) of 5-minute wind speed averages were less than 12 mph, 52% (402/768) were between 12–15 mph, 21% (163/768) were between 15–20 mph, and 0.4% (3/768) were between 20–25 mph. Emission factors were computed for each of the midpoints of these wind speed ranges, and (1) these factors were multiplied by the corresponding fractions of 5-minute periods contained in each range, and (2) the products from each range were summed together to produce an equivalent hourly emission factor for each speed bin range that represents the contributions of the 5-minute average emission factors for the same hours.

At the Pinal County Housing site, no hourly wind speed higher than 25 mph was recorded in the recent year data. Thus, the highest hourly wind speed range for which an emission factor was computed was the 20 – 25 mph range. The composite hourly emission factors developed for each wind speed bin were then applied to all disturbed soils in the modeling domain on each hour of the attainment design day of 1/1/2008 at the Pinal County Housing site on which the hourly average wind speed fell within the same speed bin. Corresponding emission factors for undisturbed soils in the modeling domain were computed by applying the Barstow emission factor ratio[7] for disturbed to undisturbed soils to the disturbed soil emission factors in each wind speed bin.

Because the Pinal County Housing 5-minute average wind speed data grouped almost all high wind speeds within only two 5 mph speed bins, the high wind design day modeling for this site reported a limited range of windblown PM_{10} emission rates for disturbed and undisturbed lands. This range did not correspond well with the range of PM_{10} concentrations recorded during high wind hours at the monitor, and the reason was deduced to be the very limited number of speed bins in which PM_{10} emission factors were constant. To improve this correspondence, the MAG method of using 5 mph speed bins for emission calculations was altered to use 1 mph speed bins. This change resulted in 10 wind speed bins, and accompanying emission factors, being used to characterize hourly average windblown PM_{10} emission rates from disturbed and undisturbed lands instead of the two speed bins produced by use of the MAG method.

Histograms of 5-minute average wind speeds within each 1 mph wind speed bin were constructed using the same method used by MAG for 5 mph speed bins. Hourly average wind speeds recorded at the Pinal County Housing monitor at the same time as 5-minute average speeds were sorted into 1 mph speed bins, and the histograms of 5-minute average speeds related to these hours were compiled. The histograms developed from the Pinal County Housing (PCH) and Stanfield wind speed data are shown in Tables BV-2 and BV-3, respectively.

Windblown PM_{10} emission factors were calculated from the histograms of 5-minute wind speeds tabulated in Tables BV-2 and BV-3. The MAG emission factor equation for disturbed soils (PM_{10} emission factor = 4.36x10-15u*4.3961 g/cm2-sec where u* is the friction velocity) was used to calculate emission factors at the midpoints of 1 mph speed bins and used to represent all 5-minute periods within each bin. Then, within each hourly average 1 mph wind speed bin, the numbers of 5-minute periods were multiplied by the associated emission factors and averaged to produce hourly average emission factors.

Tables BV-4 and BV-5 present the resulting emission factors, by 1 mph hourly average wind speed bin, derived from the PCH and Stanfield 5-minute and hourly average wind speed data using the composite Nickling and Gillies emission equation for all land uses.

[7] See Appendix 4 of the 2008 Maricopa PM10 Periodic Emission Inventory: "As a surrogate, the ratio of stable to disturbed vertical fluxes found in the wind tunnel studies performed in Barstow, California (Macpherson et al., 2008) was used to develop the vertical flux for stable land uses."
http://www.maricopa.gov/aq/divisions/planning_analysis/docs/2008_PM10/App4_WindblownDust.pdf

Table BV-2: Distribution of 5-Minute Wind Speed Periods in Each 1 Mph Wind Speed Bin using the Hourly and 5-Minute Wind Speed Data Collected at PCH

	5min Wind Speed Bin																				
	Minute MPH																				
Hourly MPH	**0**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**Total**
12	118	67	63	30	22	1	6	4		1											312
13	67	38	48	54	30	6	10	5	4	2											264
14	26	32	65	72	66	16	28	12	2	4		1									324
15	9	10	25	28	44	7	23	14	10	4	1	2	1		1					1	180
16	4	5	9	14	26	10	18	14	11	6	1		2								120
17		5	15	13	26	10	26	19	25	12	11	6									168
18	4	2	2	17	13	4	29	18	23	15	14	8	3	3	1						156
19		1	2	1	7	1	7	12	14	21	6	6	2	1	3						84
20					5		6	10	18	23	20	18	6	2							108
21				1		4	2	12	13	12	9	18	11	6	3	4	1				96
22							1	2	4	6	8	13	11	5	7	2			1		60
23						1		1	3	4	5	9	5	9	4	3	3			1	48
24											2	5	5	7	12	2	1		2		36
25											2	2	4	8	6	5	5	3	1		36
26											1	3			5	3	3	2	5	2	24
27									1			1			2	2	2		1	3	12
Total	**228**	**160**	**229**	**230**	**239**	**60**	**156**	**123**	**128**	**110**	**80**	**92**	**50**	**41**	**44**	**21**	**15**	**5**	**10**	**7**	**2028**

Table BV-3: Distribution of 5-Minute Wind Speed Periods in Each 1 Mph Wind Speed Bin using the Hourly and 5-Minute Wind Speed Data Collected at Stanfield

	5 min Wind Speed Bin																		
	Minute MPH																		
Hourly MPH	**0**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**Total**
12	307	203	129	79	42	26	5	7	1	2	3	0	0	0	0	0	0	0	804
13	89	99	113	76	43	24	9	7	1	2	0	0	2	2	1	0	0	0	468
14	62	42	90	122	95	61	36	10	6	3	0	1	0	0	0	0	0	0	528
15	34	29	45	72	99	78	40	22	13	7	1	1	0	1	0	0	0	2	444
16	2	2	3	26	21	30	29	16	10	5	0	0	0	0	0	0	0	0	144
17	1	1	2	5	6	10	4	5	6	2	3	2	0	1	0	0	0	0	48
18	0	1	0	2	2	6	9	9	10	6	1	1	0	1	0	0	0	0	48
19	1	0	0	1	1	1	3	5	1	2	4	3	0	2	0	0	0	0	24
20	0	0	0	0	0	1	0	1	3	4	1	0	1	1	0	0	0	0	12
Total	**496**	**377**	**382**	**383**	**309**	**237**	**135**	**82**	**51**	**33**	**13**	**8**	**3**	**8**	**1**	**0**	**0**	**2**	**2520**

Table BV-4: High Wind Emission Factors Based on PCH 5-Minute Wind Speed Data

Wind Speed Bins (mph)	Disturbed Soil EF (g/m^2-s)	Stable Soil EF (g/m^2-S)
12	3.060E-05	6.168E-06
13	4.642E-05	9.358E-06
14	6.580E-05	1.327E-05
15	1.039E-04	1.801E-05
16	1.146E-04	1.986E-05
17	1.467E-04	2.542E-05
18	1.840E-04	3.188E-05
19	2.316E-04	4.013E-05
20	2.714E-04	4.055E-05
21	3.390E-04	5.064E-05
22	4.270E-04	6.380E-05
23	4.888E-04	7.303E-05
24	6.034E-04	9.015E-05
25	6.869E-04	9.129E-05
26	8.867E-04	1.178E-04
27	9.137E-04	1.214E-04
28	1.131E-03	1.503E-04
29	1.307E-03	1.737E-04
30	1.503E-03	1.813E-04

Table BV-5: High Wind Emission Factors Based on STF 5-Minute Wind Speed Data

WSPD Bins (mph)	Disturbed Soil EF (g/m^2-s)	Stable Soil EF (g/m^2-S)
12	3.054E-05	6.157E-06
13	4.890E-05	9.858E-06
14	6.289E-05	1.268E-05
15	8.586E-05	1.488E-05
16	1.090E-04	1.889E-05
17	1.484E-04	2.571E-05
18	1.727E-04	2.993E-05
19	2.351E-04	4.075E-05
20	2.684E-04	4.010E-05
21	3.449E-04	5.152E-05
22	4.193E-04	6.265E-05
23	5.054E-04	7.551E-05
24	6.044E-04	9.030E-05
25	7.175E-04	9.536E-05
26	8.461E-04	1.124E-04
27	9.915E-04	1.318E-04
28	1.155E-03	1.535E-04
29	1.339E-03	1.779E-04
30	1.544E-03	1.862E-04

BVI. Evaluation of a Wind Erosion PM_{10} Emission Equation for Agricultural Lands in the Western Pinal County PM_{10} Nonattainment Area

Evaluation of a Wind Erosion PM_{10} Emission Equation for Agricultural Lands in the Western Pinal County PM_{10} Nonattainment Area

In the compilation of emission factors for windblown PM_{10} in the Maricopa County Air Quality Department's (MCAQD) 2008 Periodic Emission Inventory (PEI) for PM_{10} and the Maricopa Association of Government's (MAG) 2012 Five Percent Plan for PM_{10} for the Maricopa County Nonattainment Area, different equations were used to compute factors for agricultural and non-agricultural lands. The equation chosen for agricultural lands did not account for wind speed, which the bulk of windblown dust research has demonstrated is one of the dominant factors influencing the magnitude emissions rates. Because of the clear relationship between hourly-average wind speed and PM_{10} concentrations at each of the Pinal County PM_{10} monitoring stations for which a 24-hour attainment demonstration was proposed, Sierra Research concluded that the MAG equation for agricultural lands was not satisfactory and the development of a windspeed-based equation was undertaken. This appendix summarizes the effort to evaluate and select a substitute equation for quantifying windblown PM_{10} emissions in the Pinal County PM_{10} nonattainment area.

Nickling and Gillies Study – In 1986, W.G Nickling and J.A. Gillies[8] conducted portable wind tunnel tests of the windblown PM_{10} potential of soil surfaces at 13 sites in Arizona to assess emission thresholds and rates in support of several objectives. These objectives included the development of an analytical tool for estimating total PM_{10} emissions of anthropogenically disturbed soils during a regional high event, and to quantify the particle size distribution of windblown dust from these surfaces for use in constructing emission inventories for the then-proposed PM_{10} national ambient air quality standard. Sites that were tested were located primarily in Maricopa and Pinal Counties in central Arizona.

Many of the wind tunnel tests were conducted on soils that had been freshly disturbed for economic or recreational reasons. Such lands included active construction sites, agricultural fields, mine tailings piles, off-road vehicle use areas, and disturbed desert lands. The remainder of tests were conducted on soils that were relatively undisturbed, such as dry river bottoms, isolated desert lands, and abandoned agricultural lands. In each test, measurements were made of threshold velocities for the wind entrainment of dust, and vertical and horizontal particulate and sand flux rates as functions of wind speed. At the conclusion of data collection and analysis, the authors attempted to relate PM_{10} emissions rates to different soil characteristics with limited success.

MCAQD 2008 PEI Windblown PM_{10} Methodology – The windblown PM_{10} emission inventory that is contained in the MCAQD 2008 Periodic Emission Inventory (PEI)[9] is calculated using two different emission factor equations: one equation, derived from the Nickling and Gillies

[8] "Evaluation of Aerosol Production Potential of Type Surfaces in Arizona," prepared for Engineering-Science by W.G. Nickling and J.A. Gillies, for EPA Contract No. 68-02-380, September 1986.
[9] "2008 PM10 Periodic Emissions Inventory for the Maricopa County, Arizona, Nonattainment Area," Maricopa County Air Quality Department

1986 study, was applied to all non-agricultural lands; a second equation, derived from research conducted by the U.S. Department of Agriculture's Soil Conservation Service, was applied to agricultural lands.

Analysis conducted by MCAQD of the relationships between shear velocity (a measure of the rate at which wind speed near the ground increases with height above the ground) and PM_{10} emissions concluded that agricultural soils behaved differently than non-agricultural soils. This conclusion was based on an analysis that combined data from three tests conducted on agricultural soils at University of Arizona Experimental Farms in Mesa, Maricopa, and Yuma, Arizona. As described in the Nickling and Gillies report, the surface roughness values of the three sites varied significantly. The Maricopa site had been recently tilled while the soil was moist and the surface was extremely cloddy. The Mesa and Yuma sites had also been recently tilled, but the soil moistures there were extremely low and the roughness heights were in the middle of the range representing the non-agricultural sites. Elimination of the data from the Maricopa site resulted in a relationship between shear velocity and PM_{10} emissions for the remaining two agricultural sites that was similar to the relationship for non-agricultural soils.

Conclusion – Because the soil textures, roughness heights, and relationships between shear velocity and PM_{10} emissions of the agricultural soils, with the exception of the Maricopa roughness height, were similar to those of the non-agricultural soils, the agricultural soils should behave much like the non-agricultural soils with respect to PM_{10} emission rates. As a result, the emission equation developed by MCAQD for use in the 2008 PEI in Maricopa County was determined to be reasonably representative of windblown PM_{10} emissions from disturbed soils on both agricultural and non-agricultural lands within the Pinal County PM_{10} nonattainment area.

BVII. Ambient Monitoring Data Based Emission Factor Adjustment Arizona Department of Environmental Quality (ADEQ) Air Quality Division

Ambient Monitoring Data Based Emission Factor Adjustments

April 10th, 2013

FINAL REPORT

Arizona Department of

Environmental Quality

Introduction

This document provides a brief overview of the development and initial testing of a method which attempts to account for particulate matter concentration variation in Pinal County, Arizona during sustained high wind (>12 mph) events. Emission factors are often an estimation of maximum emission potential and are not always representative of the actual environment. This adjustment methodology would be applied to the emission factors developed in the MAG 5% Plan high wind methodology which has already been approved by EPA. Land use dependent EFs derived from literature assume static emission rates, usually altering with wind speed, but do not account for temporal variation of these EFs. The method outlined below attempts to account for environmental factors, ranging from the lack of substantial airborne particles available for dust re-entrainment in the early hours of a high wind event to reservoir depletion in the later hours of a sustained high wind event, in an attempt to address temporal changes in emission rates during windblown dust events. To this end, PM_{10} atmospheric concentrations measured at Pinal County, Arizona monitors during high wind events were utilized to create emission factor adjustment curves at each of 4 monitors (Cowtown, Maricopa, Stanfield, and Pinal County Housing). These adjustment curves are presented as a method of altering MAG 5% Plan high wind EFs for each of the 4 monitors in the modeling of design days for the Pinal County State Implementation Plan Emission Inventory. These adjustment curves will be applied to emission factors in future design day modeling in an attempt to account for the temporal variability in particulate emissions during sustained high wind events.

Methodology

This section outlines the methods used to create the adjustment curves.

Hourly monitor measurements of PM_{10} concentrations and meteorological data were compiled for 4 monitors (Cowtown, Maricopa, Stanfield, and Pinal County Housing) located in the Pinal County nonattainment area for the year 2008. Data sets for each monitor were processed separately. Datasets were screened for high wind events meeting the following criteria:

1. An event begins when an hourly wind speed exceeds 12 mph and ends when a consecutive hourly wind speed drops below 12 mph (wind speeds were adjusted to standardized 10 m height equivalents),
2. Events must contain 5 or more consecutive hours of wind speeds greater than 12 mph,
3. Only one event could occur on a given day and must be the first event to occur on that day,

4. Events must contain peak monitor PM_{10} concentrations which exceed 200 µg/m^3,
5. Events which occurred during the monsoon summer months of July, August, and September must not be tagged as 'Exceptional Events' by Pinal County Air Quality Department (PCAQD),

For each monitor, events were separated based on the above criteria and were normalized on an hourly basis to percentages of peak PM_{10} concentrations measured. This calculation was performed by assuming the peak measured monitor concentration was equal to 100% for a given event and each previous and subsequent hourly measured concentration was some percentage of the event peak concentration. A sample is given below:

Example1: Cowtown 5/5/2008 High Wind Hours

Table BVII-1 presents the high wind hours for 5/5/2008 and the calculated adjustment distribution.

Table BVII-1: Cowtown 5/5/2008 High Wind Event

DATE	TIME	Peak Relative Time	Monitor PM_{10} [µg/m^3]	Adjustment Distribution [%]
5-May-08	12:00	-2	278.5	82%
5-May-08	13:00	-1	187.3	55%
5-May-08	14:00	0	340.5	100%
5-May-08	15:00	1	155.0	46%
5-May-08	16:00	2	167.7	49%
5-May-08	17:00	3	67.1	20%

In the case of this example, the event lasted 6 hours with a peak concentration of 340.5 µg/m^3 measured at 14:00 hours. Peak Relative Time (PRT) [hr] was calculated as the number of hours prior to or following the peak concentration hour. Adjustment distribution percentage was calculated using the following equation:

$$D_n = 100 * \left(\frac{C_n}{C_{pk}} \right)$$

where D_n is the percentage of the event peak concentration for a monitor concentration on a given hour, n; C_{pk} is the peak PM_{10} concentration measured at the monitor for a given event [µg/m^3]; and C_n is the PM_{10} concentration measured at the monitor for a given hour, n.

Once all events for a given monitor within the year of 2008 had been processed, a standard adjustment distribution curve for the monitor was created by averaging all events by hour, based on the PRT. Examples of how these averages occurred can be found in Tables BVII-2 through VII-5.

Results

The following subsections present the average adjustment distribution curves for each of the 4 monitors (Cowtown, Maricopa, Pinal County Housing (PCH), and Stanfield). Tables BVII-2, BVII-3, VII-4, and VII-5 show the adjustment distribution curves [% of peak] for each event identified using the criteria previously presented and the average adjustment distribution for Cowtown, Maricopa, PCH, and Stanfield respectively. Figures BVII-1, BVII-3, BVII-5, and BVII-7 present graphical representations of the average adjustment distribution curves for each site with calculated error in the form of one standard deviation of the mean for each hour calculated. Figures BVII-2, BVII-4, BVII-6, and BVII-8 present comparisons of the adjustment distribution curves and hourly measured PM_{10} concentrations for the Cowtown, Maricopa, PCH, and Stanfield design days. For these figures, the adjustment distribution curves were scaled so that the peak of the adjustment curve matched the peak of the monitor measured concentrations and the adjustment curves were cut to only those hours on the design days which experienced winds greater than 12 mph.

Cowtown EF Adjustment Curve

Table BVII-2: Cowtown high wind event day distributions. Columns represent separate events. All events were normalized so that event peak monitor measured concentrations occurred at a PRT=0.

PRT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Avg	Std Dev
-5																			19%							19%	
-4						23%				43%				77%			44%		12%							40%	25%
-3			73%			82%				82%				39%			54%		20%		33%					55%	25%
-2	15%		29%	62%	45%	96%				31%				45%	82%	76%	88%		35%	18%	35%				50%	51%	26%
-1	51%	20%	20%	22%	33%	93%				51%			69%	55%	55%	18%	70%	98%	78%	27%	24%		24%		34%	47%	26%
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
1	28%	54%	52%	70%	37%		85%	95%	23%		23%	12%	45%		46%	18%		36%	60%	44%	23%	44%	48%	45%	53%	45%	21%
2	23%	10%	46%	54%	21%		70%	73%	8%		17%	14%	56%		49%	22%		44%	57%	28%	6%	13%	44%	27%	9%	33%	21%
3	39%	86%	13%	78%	85%		46%	82%	16%		28%	8%	92%		20%	54%		60%	30%	10%	7%	36%	64%	27%	7%	42%	30%
4	20%	21%		43%			53%	25%	3%		42%	4%						81%	22%	42%	6%	51%	67%	24%	5%	32%	24%
5	7%	17%		73%			94%	26%			28%	4%						38%	49%		4%	14%		11%	6%	29%	28%
6	12%	19%		66%			48%				26%	3%										22%		9%		26%	21%
7	16%	39%					91%					8%												7%		32%	35%
8	17%	52%					60%																	5%		33%	27%
9	10%						43%																	6%		20%	20%
10	8%																							6%		7%	2%
11	11%																							3%		7%	5%
12	19%																							4%		12%	10%
13	12%																							4%		8%	5%
14	10%																									10%	
15	10%																									10%	
16	11%																									11%	
17	7%																									7%	
18	9%																									9%	
19	5%																									5%	
20	2%																									2%	
21	3%																									3%	

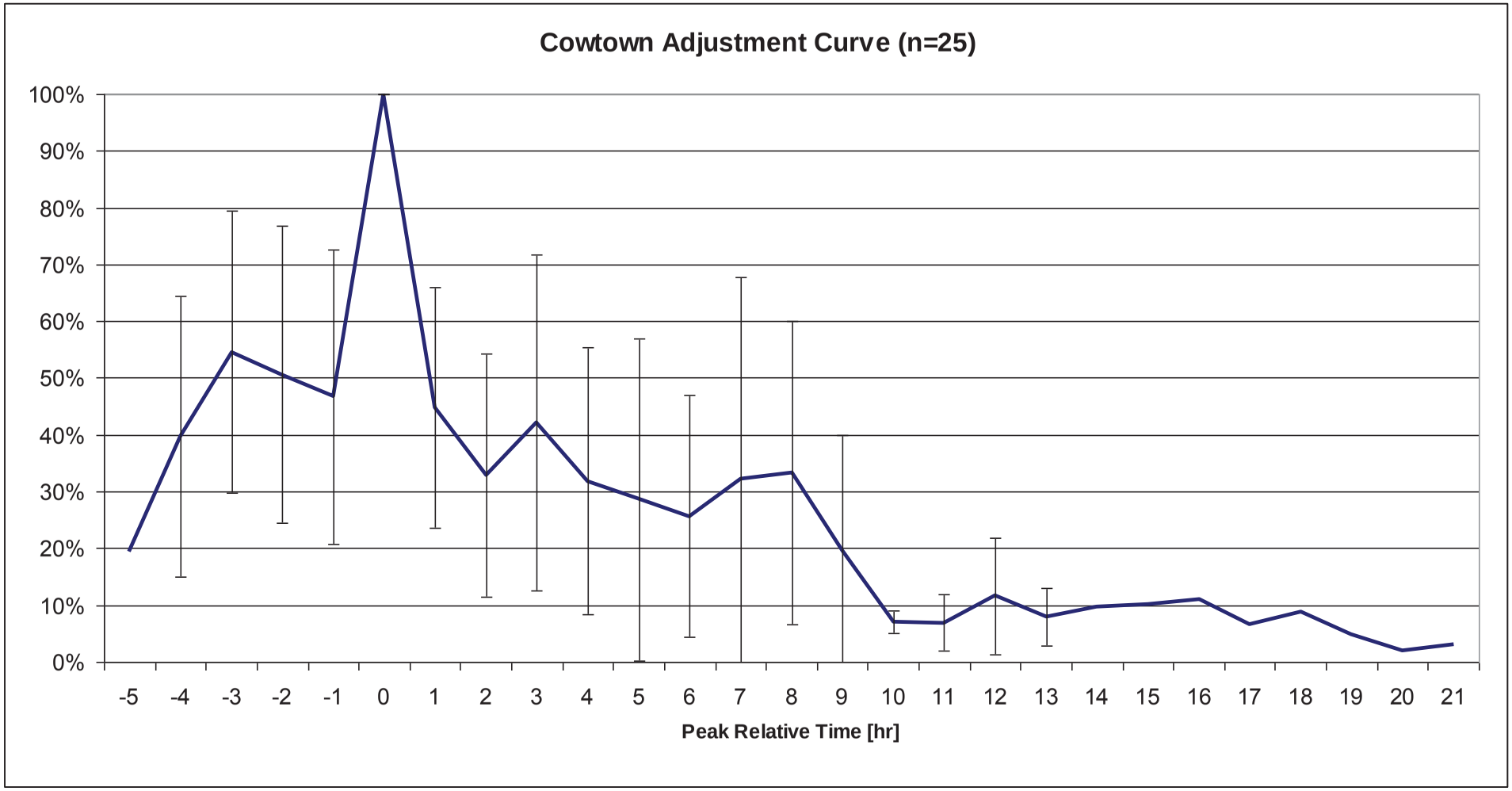

Figure BVII-1: Cowtown adjustment curve for the year of 2008. Event sample size was 25. Error bars represent one standard deviation.

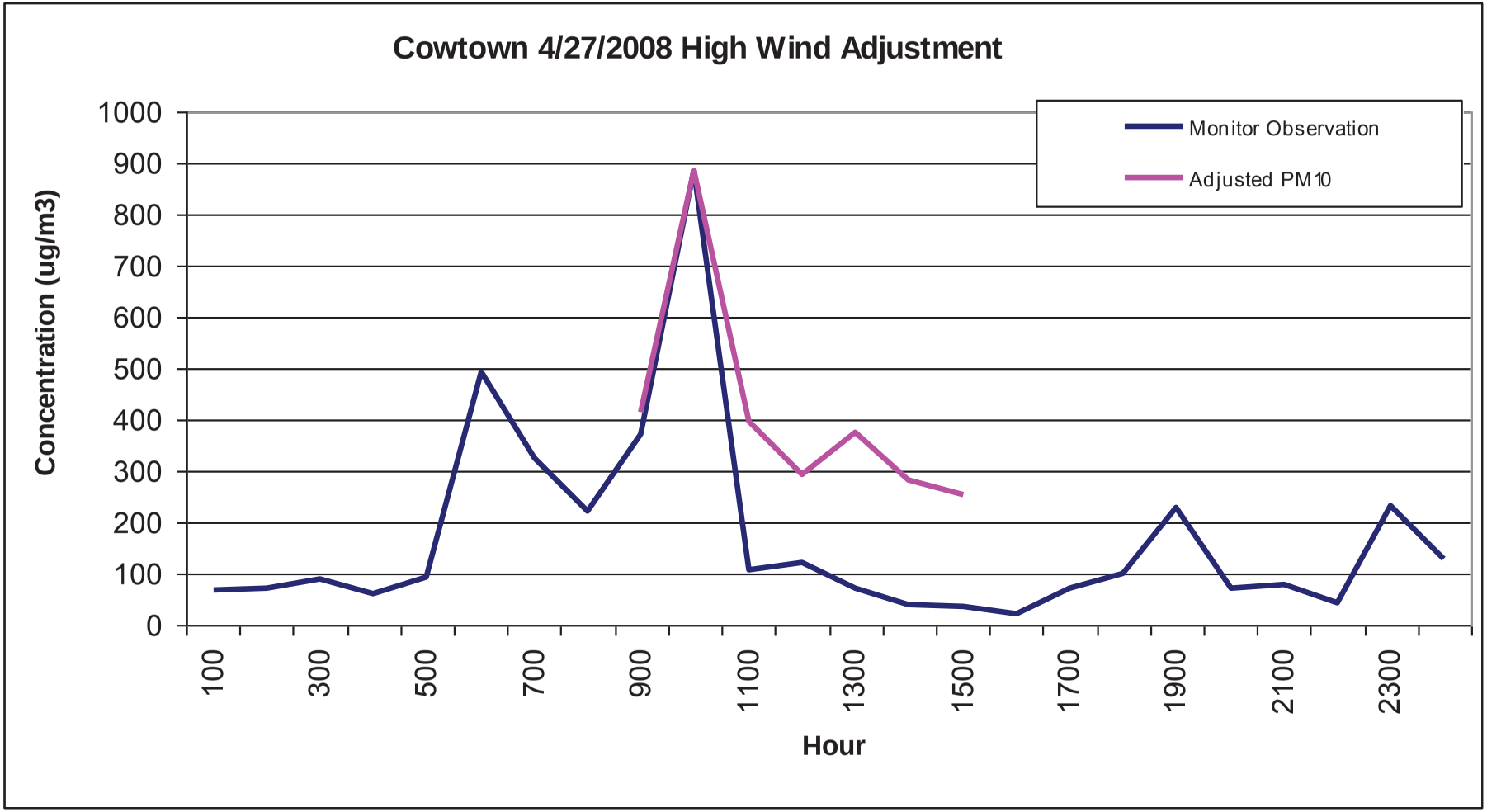

Figure BVII-2: Cowtown adjustment curve (pink) for the year of 2008 normalized to the peak concentration for the 4/27/2008 design day. Monitor observed concentrations are shown in blue for curve comparison.

Maricopa EF Adjustment Curve

Table BVII-3: Maricopa high wind event day distributions. Columns represent separate events. All events were normalized so that event peak monitor measured concentrations occurred at a PRT=0.

PRT	1	2	3	4	5	6	7	8	9	10	11	12	13	Average	Std Dev
-13	6%													6%	
-12	6%													6%	
-11	7%													7%	
-10	38%													38%	
-9	36%													36%	
-8	20%													20%	
-7	11%													11%	
-6	6%						9%							8%	2%
-5	8%						9%			75%				31%	38%
-4	8%						22%	26%		31%			66%	30%	22%
-3	19%	39%					51%	28%		54%			83%	46%	23%
-2	39%	13%	12%	31%	40%	37%	28%	32%		52%			75%	36%	18%
-1	97%	8%	20%	27%	82%	61%	54%	52%	8%	64%		46%	59%	48%	28%
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
1	91%	14%	75%	54%	31%	39%	40%	70%	50%	15%	58%	47%		49%	23%
2	56%	57%	35%	27%	28%	43%	34%	72%	18%	14%	34%	48%		39%	17%
3	34%	9%	21%	14%	20%		19%	96%	12%	24%	21%	28%		27%	24%
4	23%			15%			9%	59%	5%		17%	18%		21%	18%
5	13%						9%	33%	5%		10%	14%		14%	10%
6	8%						4%	31%	3%		9%	14%		12%	10%
7	13%								4%		8%			8%	4%
8	7%								6%		7%			7%	1%
9	5%								5%		7%			5%	1%
10	5%										5%			5%	0%
11											4%			4%	
12											4%			4%	
13											4%			4%	

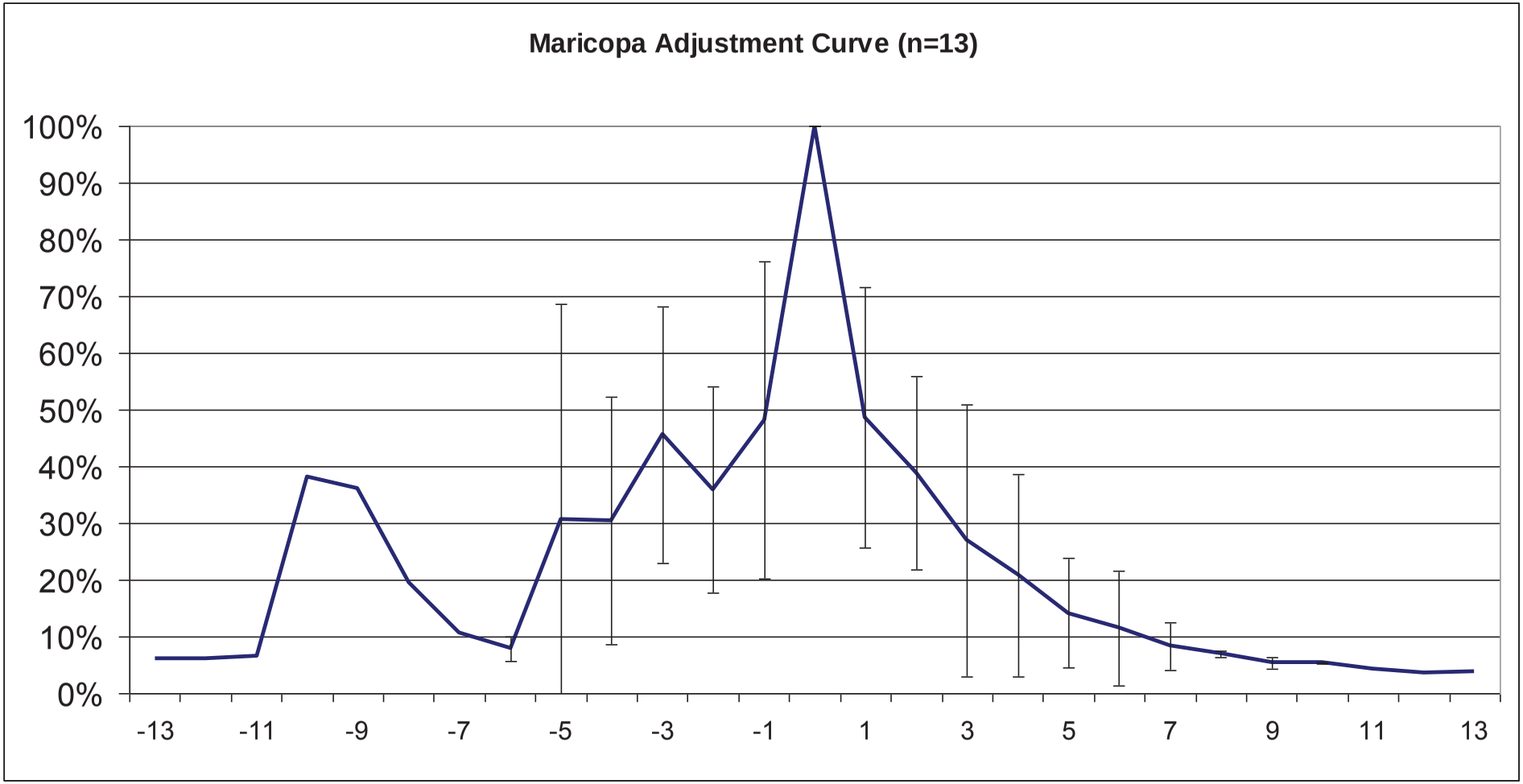

Figure BVII-3: Maricopa EF adjustment curve for the year of 2008. Event sample size was 13. Error bars represent one standard deviation.

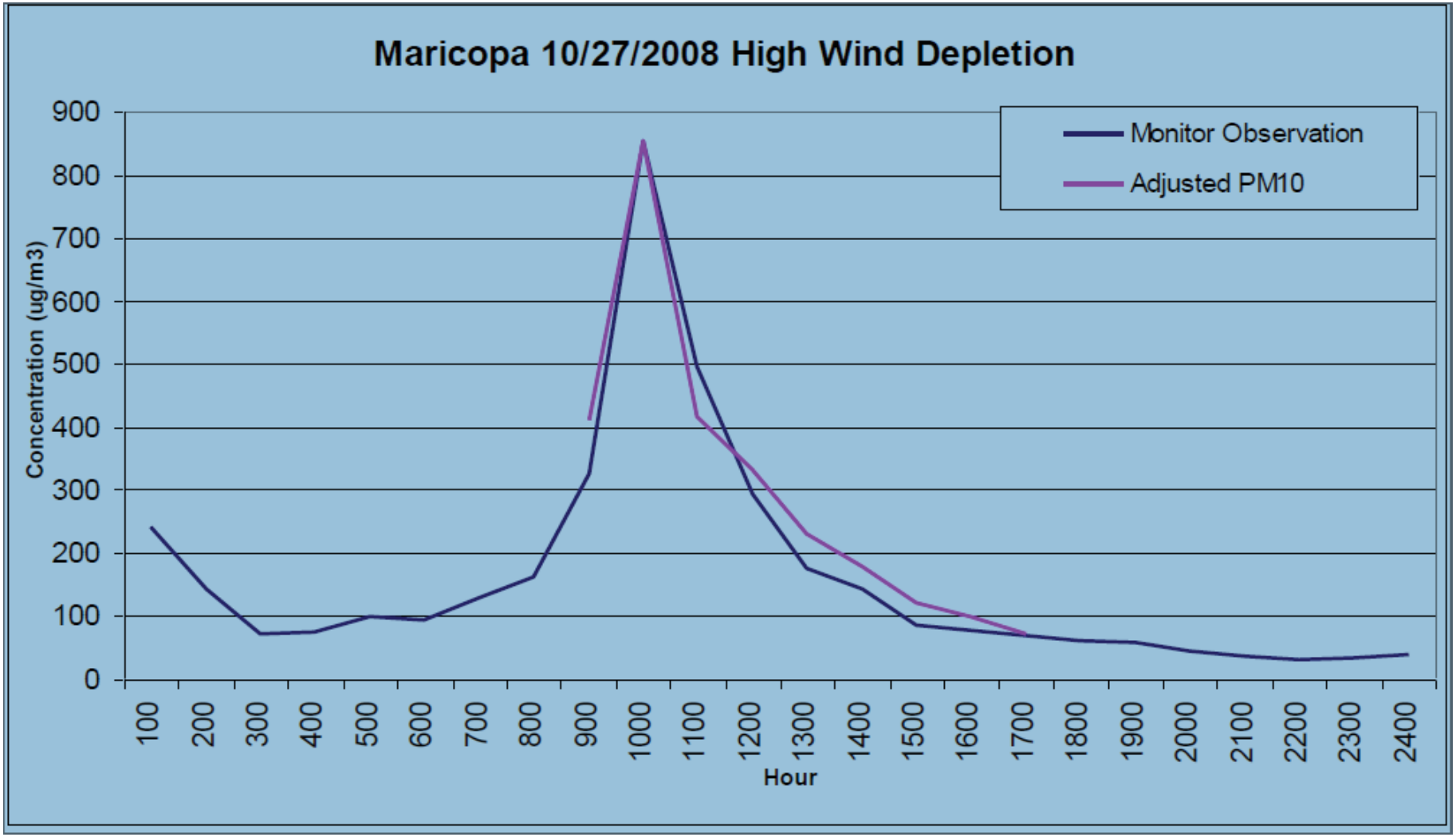

Figure BVII-4: Maricopa adjustment curve (pink) for the year of 2008 normalized to the peak concentration for the 4/27/2008 design day. Monitor observed concentrations are shown in blue for curve comparison.

Table BVII-4: Maricopa high wind event day distributions. Columns represent separate events. All events were normalized so that event peak monitor measured concentrations occurred at a PRT=0.

PRT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Avg	S.D.
-6											19%								19%	
-5		17%									19%					22%			19%	3%
-4		14%		23%							33%					49%			30%	15%
-3		13%		15%						8%	17%					39%			18%	12%
-2	77%	6%		38%						15%	34%	22%				38%		59%	36%	23%
-1	81%	4%		69%	70%	55%	80%		66%	6%	21%	36%	35%	64%		72%	62%	81%	54%	26%
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
1	70%	13%	58%	67%	36%	40%	65%	48%	53%	11%	8%	76%	19%	66%	70%	61%	89%	62%	51%	24%
2	83%	12%	16%	55%	10%	33%	37%	39%	20%		20%	52%	3%	5%	10%	42%	46%	39%	31%	22%
3	28%		0%	35%	9%	50%	38%	19%	14%		17%	63%		2%	8%	51%	23%	27%	26%	19%
4	35%		31%		8%	40%		14%			11%	96%		2%	7%	24%	49%	33%	29%	26%
5	25%		45%		6%	71%		13%			8%	25%					36%	32%	29%	20%
6	6%		51%			43%		10%				21%					27%		26%	18%
7	4%											11%					16%		10%	6%
8	5%											17%							11%	8%
9	6%											13%							10%	5%
10	6%											10%							8%	3%
11	3%											10%							6%	5%
12	12%											11%							12%	1%
13	3%											12%							7%	7%
14	3%																		3%	
15	3%																		3%	
16	2%																		2%	
17	1%																		1%	
18	3%																		3%	

PRT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Avg	S.D.
19	5%																		5%	
20	4%																		4%	
21	4%																		4%	
22	6%																		6%	
23	11%																		11%	
24	13%																		13%	
25	16%																		16%	
26	11%																		11%	
27	5%																		5%	
28	3%																		3%	
29	3%																		3%	
30	45%																		45%	
31	3%																		3%	

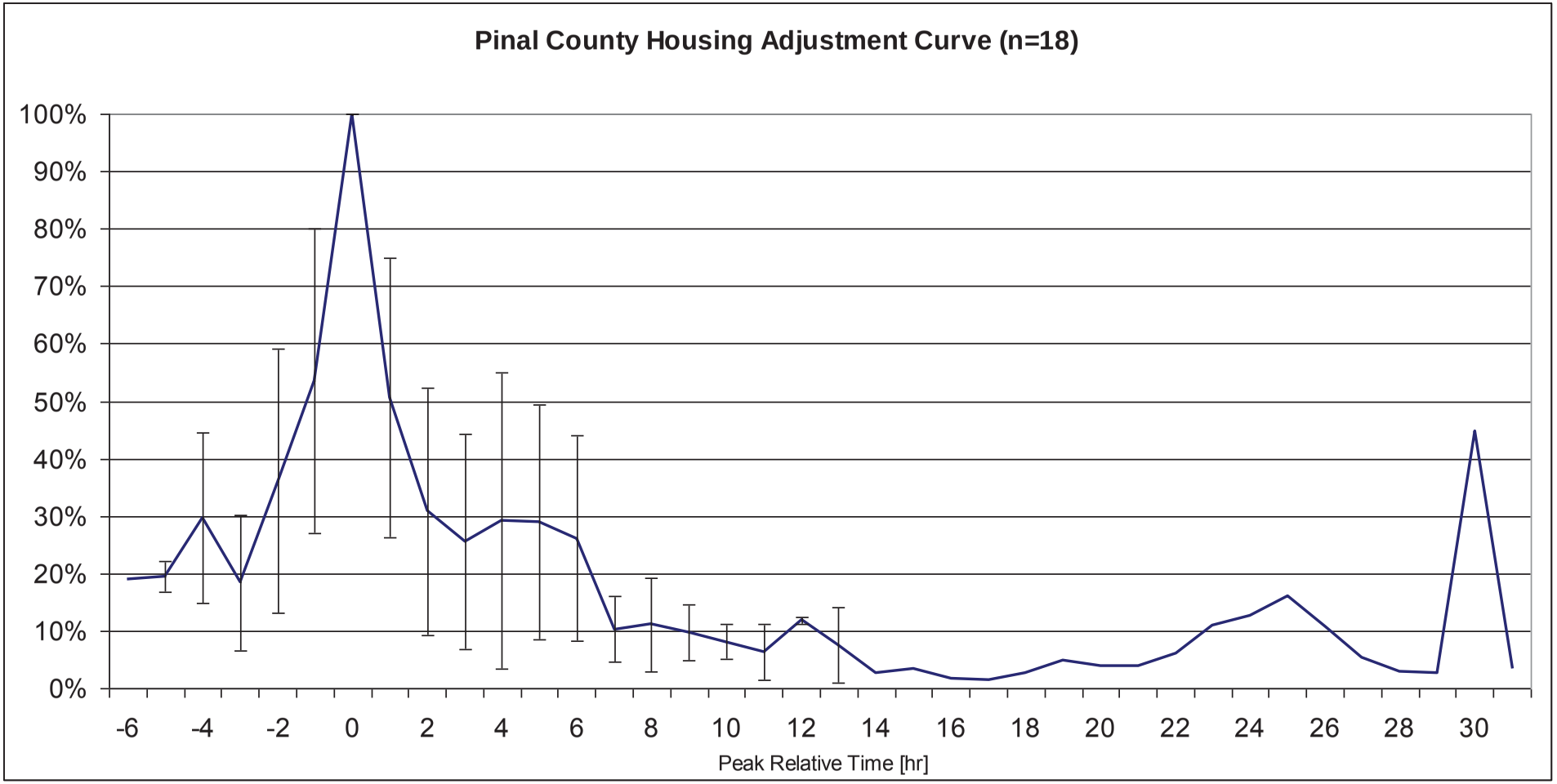

Figure BVII-5: Pinal County Housing EF adjustment curve for the year of 2008. Event sample size was 18. Error bars represent one standard deviation.

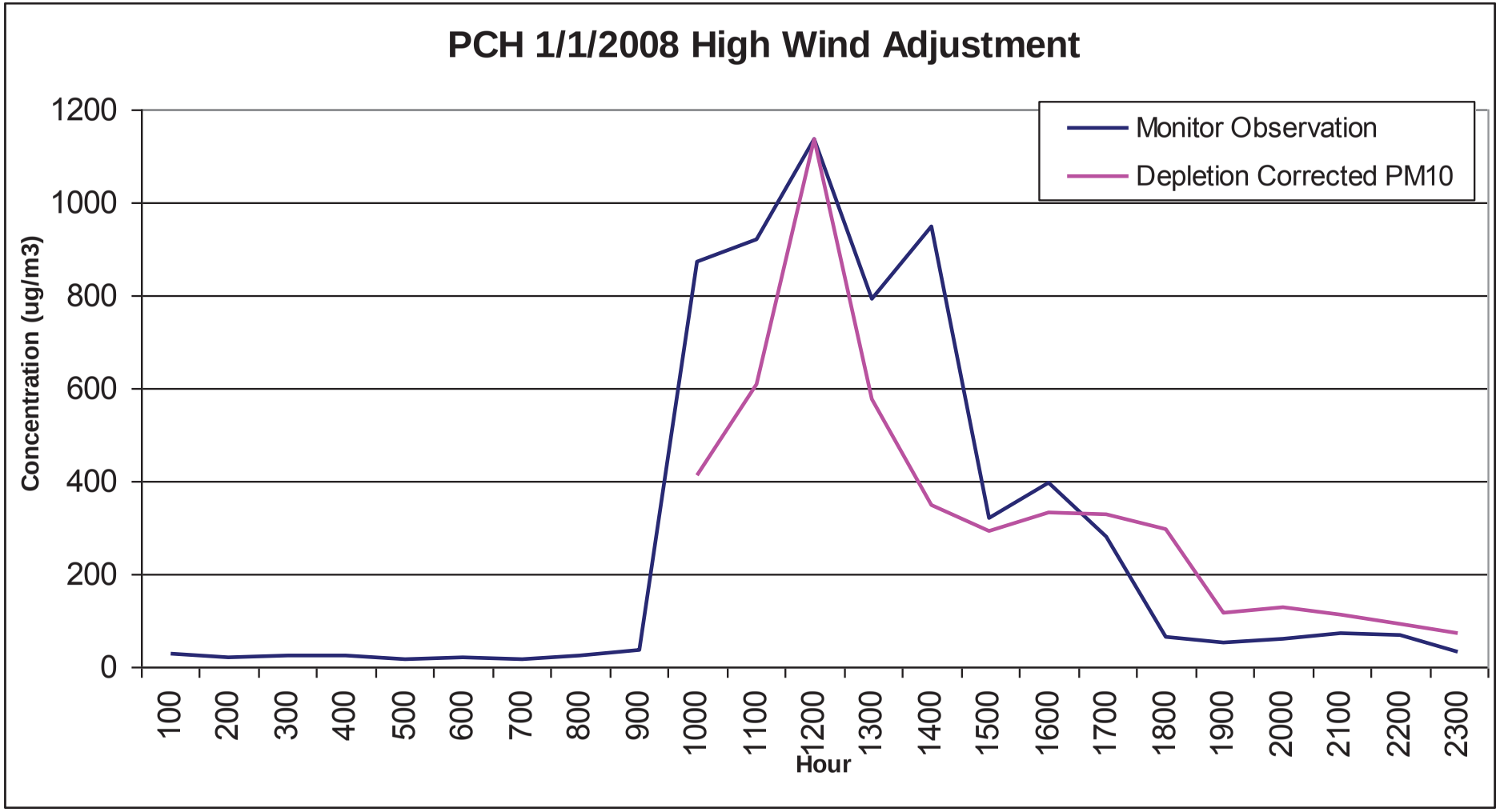

Figure BVII-6: Pinal County Housing EF adjustment curve (pink) for the year of 2008 normalized to the peak concentration for the 4/27/2008 design day. Monitor observed concentrations are shown in blue for curve comparison.

Table BVII-5: Maricopa high wind event day distributions. Columns represent separate vents. All events were normalized so that event peak monitor measured concentrations occurred at a PRT=0.

PRT	1	2	3	4	5	6	7	8	9	10	11	12	13	Average	Std Dev
-10					9%									9%	
-9					10%									10%	
-8					13%									13%	
-7					6%									6%	
-6					16%									16%	
-5			5%		17%			36%						19%	16%
-4		33%	5%		23%			39%	45%					29%	16%
-3		24%	7%		39%			55%	54%					36%	20%
-2		18%	50%		29%			78%	70%				61%	51%	24%
-1	37%	22%	13%	40%	21%	60%		72%	66%		30%	76%	56%	45%	22%
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
1	43%	29%	26%	29%		47%	88%	22%	24%	76%	96%	44%	73%	50%	27%
2	11%	8%	3%	11%		22%	37%	68%	16%	79%	76%	15%	57%	34%	29%
3	5%	10%		3%		14%	9%	60%	35%	35%	35%	10%	32%	23%	18%
4	5%						22%	44%	34%	21%	19%	6%	16%	21%	13%
5	2%						24%	34%	14%	8%		5%	11%	14%	11%
6	2%						38%	34%	7%	14%		3%	11%	16%	14%
7	5%							31%		9%				15%	14%
8	20%							25%		11%				19%	7%
9	3%							25%		10%				13%	11%
10	2%													2%	
11	2%													2%	
12	1%													1%	
13	1%													1%	
14	1%													1%	

PRT	1	2	3	4	5	6	7	8	9	10	11	12	13	Average	Std Dev
15	1%													1%	
16	1%													1%	
17	1%													1%	
18	1%													1%	
19	1%													1%	
20	1%													1%	
21	4%													4%	
22	17%													17%	
23	9%													9%	
24	5%													5%	
25	3%													3%	
26	2%													2%	
27	2%													2%	
28	2%													2%	
29	1%													1%	
30	1%													1%	

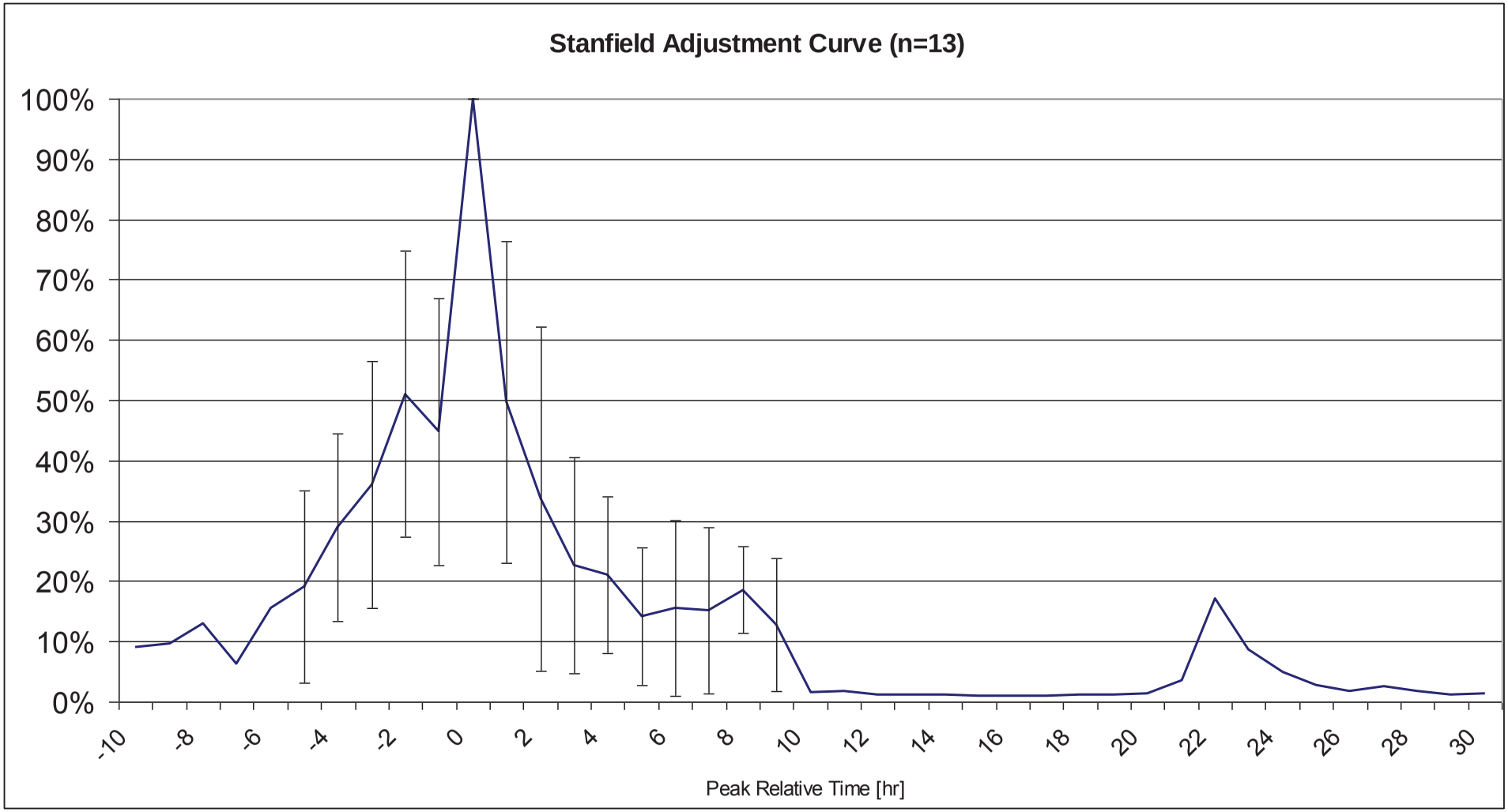

Figure BVII-7: Stanfield EF adjustment curve for the year of 2008. Event sample size was 13. Error bars represent one standard deviation.

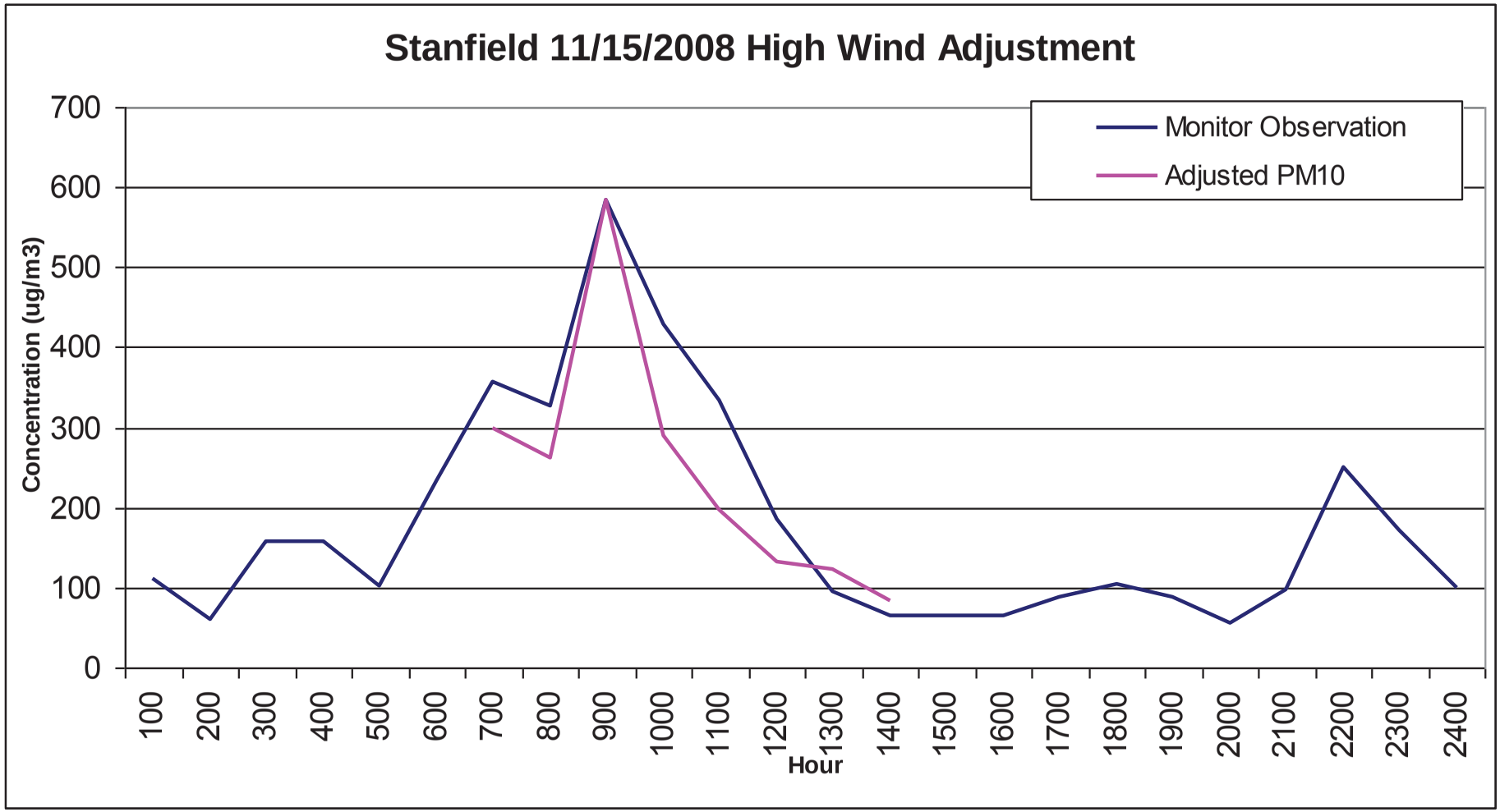

Figure BVII-8: Stanfield EF adjustment curve (pink) for the year of 2008 normalized to the peak concentration for the 4/27/2008 design day. Monitor observed concentrations are shown in blue for curve comparison.

EF Adjustment Curve Comparison

EF adjustment curves for the four monitors are presented in tabular (Table BVII-6) and graphical (Figure BVII-9) form in this section for comparison of how local conditions alter the adjustment curves throughout the nonattainment area. Future modeling would apply these curves to all land use emission factors for high wind events at a particular monitor by assuming peak monitor concentrations occur at PRT = 0 and applying emission factors which are multiplied by the percentages listed below for each previous and subsequent hour prior to modeling individual hours of the day.

Table BVII-6: EF adjustment curves for each of the monitoring locations. The EF adjustment curves exhibited are truncated to those hours for each monitor for which standard deviations could be calculated.

PRT	Stanfield	PCH	Maricopa	Cowtown
-6			8%	
-5	19%	19%	31%	
-4	29%	30%	30%	40%
-3	36%	18%	46%	55%
-2	51%	36%	36%	51%
-1	45%	54%	48%	47%
0	100%	100%	100%	100%
1	50%	51%	49%	45%
2	34%	31%	39%	33%
3	23%	26%	27%	42%
4	21%	29%	21%	32%
5	14%	29%	14%	29%
6	16%	26%	12%	26%
7	15%	10%	8%	32%
8	19%	11%	7%	33%
9	13%	10%	5%	20%
10		8%	5%	7%
11		6%		7%
12		12%		12%
13		7%		8%
14				10%

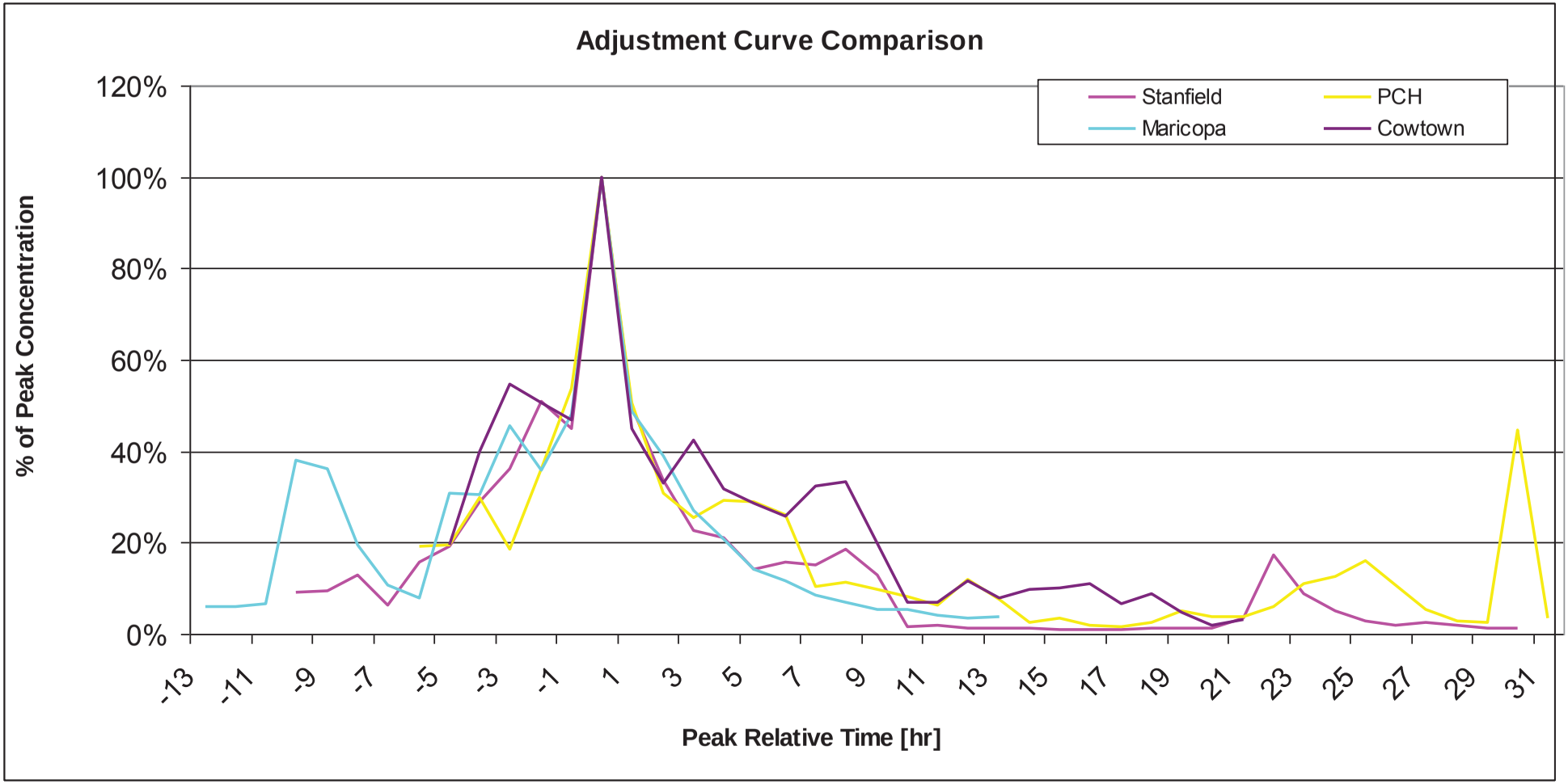

Figure BVII-9: Site specific adjustment curve comparison for 4 monitors within the Pinal County nonattainment area.

PCH Test

Examination of Figures BVII-2, BVII-4, BVII-6, and BVII-8 revealed that the EF adjustment curve for Maricopa matched the design day concentration curve very well and Cowtown and Stanfield EF adjustment curves matched design day concentration curves well, while the Pinal County Housing EF adjustment curve failed to account for the multiple PM_{10} concentration spikes seen on the design day. Therefore, PCH can be considered a worst case scenario when applying the EF adjustment curve. With this information in mind, ADEQ decided to take AERMOD modeling results for the PCH design day and apply the EF adjustment curve to the modeling results to determine if the modeling accuracy would improve with the application of these hourly adjustments.

Previous AERMOD modeling of the PCH design day tested two sets of EFs (MAG EFs and Back Calculation EFs). This testing showed that the MAG EFs calculated PM_{10} concentrations better in the early high wind hours of the design day, while failing to do so in later high wind hours when monitor measured concentrations decreased despite sustained high winds. The Back Calculation EFs overestimated PM_{10} concentrations during early high wind hours of the design day, but better estimated the later high wind hours when monitor measured concentrations decreased.

While the intent is to apply the EF adjustment curve to EFs prior to modeling, below ADEQ provides the results of a quick test of the PCH adjustment curve application to the MAG PM_{10} concentrations output from the AERMOD model. In this exercise the EF adjustment curve was applied by examining the monitor PM_{10} concentrations and determining the PM_{10} peak concentration hour, 12:00. This was assumed to be equal to a Peak Relative Time (PRT) of zero. The EF adjustment curve was then applied on an hour by hour basis so that the MAG PM_{10} hourly AERMOD concentrations were multiplied by the corresponding adjustment curve %. The equation used is given below:

$$PM_{MAG\text{-}adj} = PM_{MAG} * (D/100)$$

where $PM_{MAG\text{-}adj}$ is the adjustment curve corrected MAG AERMOD concentration for an individual hour [$\mu g/m^3$], PM_{MAG} is the MAG AERMOD concentration for the same hour, and D is the adjustment curve value [%] for the PRT which corresponds to the same hour.

The monitor observed PM_{10} concentrations (PM_{obs}) and results for the PCH design day AERMOD run using the Back Calculation EFs ($PM_{BackCalc}$), the MAG EFs (PM_{MAG}), and EF adjustment curve correcting the MAG AERMOD results ($PM_{MAG\text{-}adj}$) are presented in Table BVII-7 and in Figure BVII-

10. The average absolute modeling bias for the back calculation, MAG, and MAG adjusted AERMOD results were 271%, 587%, and 53% showing the drastic improvement that the application of the EF adjustment curve can have for the MAG EFs. However, it is seen that the $PM_{MAG\text{-}adj}$ have fairly consistently under predicted early high wind PM_{10} concentrations. This problem should easily be addressed during design day model calibration. The PCH design day is unique in that there are 3 distinct spikes in monitor observed PM_{10} concentrations at 12:00, 14:00, and 16:00. The 12:00 and 16:00 peaks are captured by the PCH adjustment curve, but the 14:00 is not. While this may be a small concern for the PCH design day, Maricopa, Cowtown, and Stanfield exhibited much better agreement between the monitor observed concentration curve and the adjustment curve; therefore, this is believed to be a problem unique to the PCH design day.

Table BVII-7: Pinal County Housing (1/1/2008) AERMOD modeling and EF adjustment results and the calculated biases for each hour of high wind (>12 mph) activity.

		PM_{10} Concentrations [μg/m^3]				Modeling Bias [%]		
Hour	Adjustment Curve	PM_{obs}	$PM_{BackCalc}$	PM_{MAG}	$PM_{MAG\text{-}adj}$	$PM_{BackCalc}$	PM_{MAG}	$PM_{MAG\text{-}adj}$
10:00	36%	871	946	648	234	8.6%	-25.6%	-73.1%
11:00	54%	919	2182	1112	596	137.4%	21.0%	-35.2%
12:00	100%	1136	1867	951	951	64.3%	-16.3%	-16.3%
13:00	51%	791	1986	1012	512	151.1%	27.9%	-35.3%
14:00	31%	946	2049	1044	321	116.6%	10.4%	-66.0%
15:00	26%	320	2445	575	147	664.1%	79.7%	-54.0%
16:00	29%	398	138	1072	314	-65.3%	169.3%	-21.2%
17:00	29%	282	211	666	193	-25.2%	136.2%	-31.7%
18:00	26%	66	409	864	226	519.7%	1209.1%	242.1%
19:00	10%	51	395	826	85	674.5%	1519.6%	66.9%
20:00	11%	62	222	676	76	258.1%	990.3%	21.8%
21:00	10%	71	221	682	66	211.3%	860.6%	-6.8%
22:00	8%	68	223	685	55	227.9%	907.4%	-18.6%
23:00	6%	33	253	772	49	666.7%	2239.4%	48.3%
					Average	**270.8%**	**586.6%**	**52.7%**

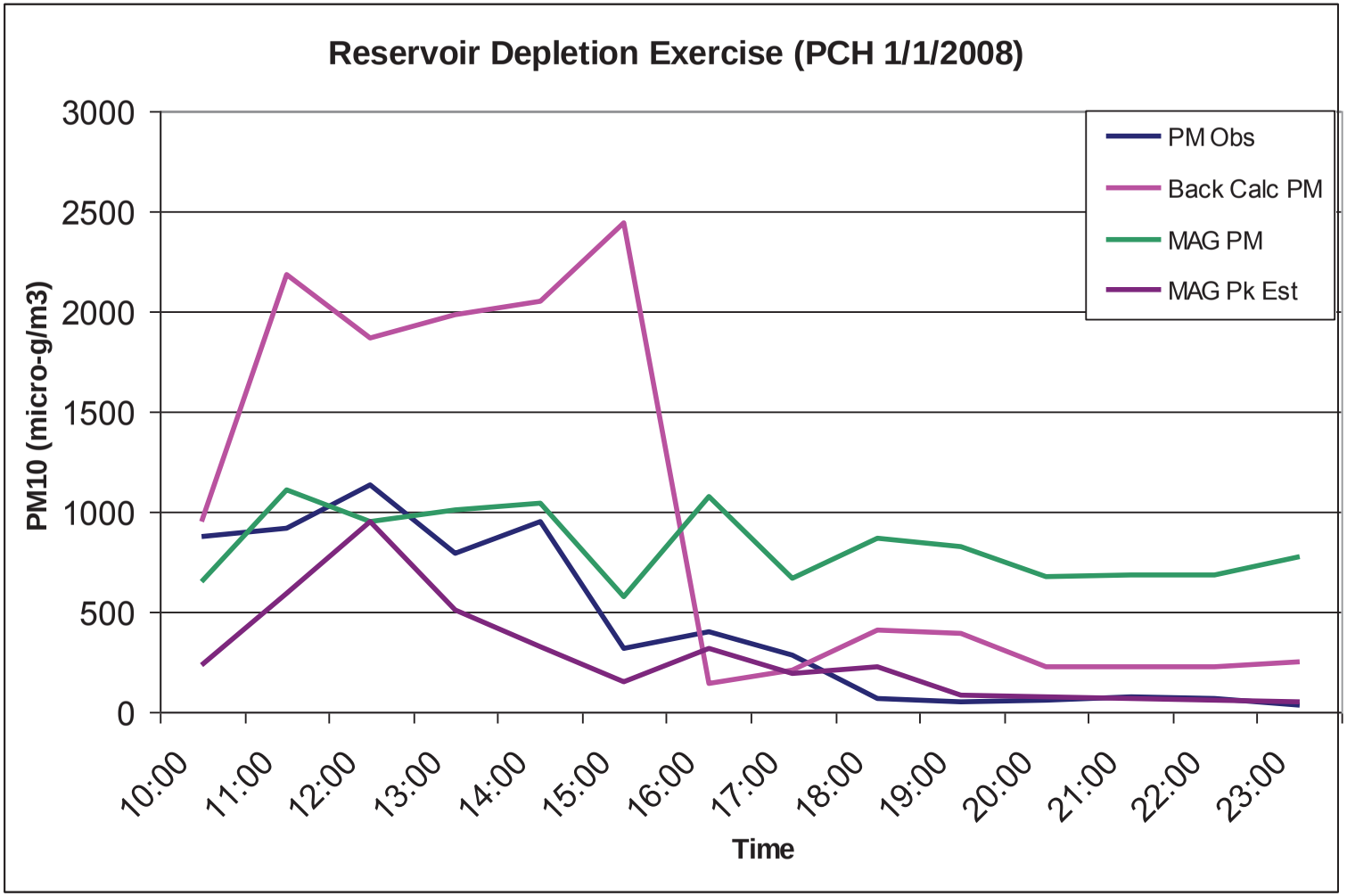

Figure BVII-10: Modeled PM10 concentrations [µg/m3] for the Back Calculation EFs (Back Calc PM), MAG EFs (MAG PM), and EF adjustment curve corrected MAG results (MAG Pk Est) as compared to monitor measured concentrations (PM Obs).

BVIII.NONROAD Input Files (2008)

```
Written by Nonroad interface at 7/23/2013 5:15:01 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.

9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.

-------------------------------------------------------

PERIOD PACKET

This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:

1 - Char 10 - Period type for this simulation.
                  Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
                  Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
                  Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type             : Monthly
Summation type          : Period total
Year of episode         : 2008
Season of year          :
Month of year           : January
Weekday or weekend      : Weekday
Year of growth calc     :
Year of tech sel        :
/END/

-------------------------------------------------------

OPTIONS PACKET

This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.

1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
                  Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
```

```
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1                 : PINAL COUNTY, AZ
Title 2                 : JANUARY 2008
Fuel RVP for gas        : 8.8
Oxygen Weight %         : 3.5
Gas sulfur %            : 0.0015
Diesel sulfur %         : 0.0006
Marine Dsl sulfur %     : 0.0006
CNG/LPG sulfur %        : 0.003
Minimum temper. (F)     : 42
Maximum temper. (F)     : 67
Average temper. (F)     : 55
Altitude of region      : LOW
EtOH Blend % Mkt        : 100
EtOH Vol %              : 10
/END/

-------------------------------------------------------
REGION PACKET

This is the packet that defines the region for which
emissions are to be estimated.

The first record tells the type of region and
allocation to perform.

Valid responses are:
US TOTAL    - emissions are for entire USA without state
                  breakout.
50STATE     - emissions are for all 50 states
                  and Washington D.C., by state.
STATE       - emissions are for a select group of states
                  and are state-level estimates
COUNTY      - emissions are for a select group of counties
                  and are county level estimates. If necessary,
                  allocation from state to county will be performed.
SUBCOUNTY   - emissions are for the specified sub counties
                  and are subcounty level estimates. If necessary,
                  county to subcounty allocation will be performed.

The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.

US TOTAL    - Nothing needs to be specified. The FIPS
                  code 00000 is used automatically.
50STATE     - Nothing needs to be specified. The FIPS
                  code 00000 is used automatically.
STATE       - state FIPS codes
COUNTY      - state or county FIPS codes. State FIPS
                  code means include all counties in the
                  state.
SUBCOUNTY   - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/

Region Level      : COUNTY
Pinal County AZ   : 04021
/END/
or use –

Region Level      : STATE
```

```
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_jan.msg
OUTPUT DATA : c:\nonroad\outputs\p08_jan.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
```

```
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
```

```
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:37:52 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : February
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : FEBRUARY 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 44
Maximum temper. (F): 71
Average temper. (F): 57
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_feb2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_feb2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:48:23 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : March
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : MARCH 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 48
Maximum temper. (F): 77
Average temper. (F): 63
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_mar2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_mar2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 7/23/2013 3:45:00 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : April
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : APRIL 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 53
Maximum temper. (F): 86
Average temper. (F): 69
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_apr.msg
OUTPUT DATA : c:\nonroad\outputs\p08_apr.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:53:21 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : May
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : MAY 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 61
Maximum temper. (F): 94
Average temper. (F): 78
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_may2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_may2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:21:27 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : June
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : JUNE 2008
Fuel RVP for gas : 6.6
Oxygen Weight % : 0
Gas sulfur % : 0.0039
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 70
Maximum temper. (F): 103
Average temper. (F): 86
Altitude of region : LOW
EtOH Blend % Mkt : 0
EtOH Vol % : 0
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_jun2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_jun2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 12:51:09 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : July
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : JULY 2008
Fuel RVP for gas : 6.6
Oxygen Weight % : 0
Gas sulfur % : 0.0039
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 78
Maximum temper. (F): 104
Average temper. (F): 91
Altitude of region : LOW
EtOH Blend % Mkt : 0
EtOH Vol % : 0
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_jul2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_jul2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:29:23 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : August
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : AUGUST 2008
Fuel RVP for gas : 6.6
Oxygen Weight % : 0
Gas sulfur % : 0.0039
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 77
Maximum temper. (F): 102
Average temper. (F): 90
Altitude of region : LOW
EtOH Blend % Mkt : 0
EtOH Vol % : 0
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_aug2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_aug2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:58:55 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : September
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : SEPTEMBER 2008
Fuel RVP for gas : 6.6
Oxygen Weight % : 0
Gas sulfur % : 0.0039
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 71
Maximum temper. (F): 98
Average temper. (F): 85
Altitude of region : LOW
EtOH Blend % Mkt : 0
EtOH Vol % : 0
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_sep2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_sep2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 1:03:53 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : October
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : OCTOBER 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 59
Maximum temper. (F): 88
Average temper. (F): 73
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_oct.msg
OUTPUT DATA : c:\nonroad\outputs\p08_oct.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File :c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 4/21/2014 2:10:14 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : November
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : NOVEMBER 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 47
Maximum temper. (F): 75
Average temper. (F): 61
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_nov.msg
OUTPUT DATA : c:\nonroad\outputs\p08_nov.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File :c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

```
Written by Nonroad interface at 2/5/2014 2:06:29 PM
This is the options file for the NONROAD program.
The data is sperated into "packets" bases on common
information. Each packet is specified by an
identifier and a terminator. Any notes or descriptions
can be placed between the data packets.
9/2005 epa: Add growth & tech years to PERIOD packet
and Counties & Retrofit files to RUNFILES packet.
-------------------------------------------------------
PERIOD PACKET
This is the packet that defines the period for
which emissions are to be estimated. The order of the
records matter. The selection of certain parameters
will cause some of the record that follow to be ignored.
The order of the records is as follows:
1 - Char 10 - Period type for this simulation.
Valid responses are: ANNUAL, SEASONAL, and MONTHLY
2 - Char 10 - Type of inventory produced.
Valid responses are: TYPICAL DAY and PERIOD TOTAL
3 - Integer - year of episode (4 digit year)
4 - Char 10 - Month of episode (use complete name of month)
5 - Char 10 - Type of day
Valid responses are: WEEKDAY and WEEKEND
-------------------------------------------------------
/PERIOD/
Period type : Monthly
Summation type : Period total
Year of episode : 2008
Season of year :
Month of year : December
Weekday or weekend : Weekday
Year of growth calc:
Year of tech sel :
/END/
-------------------------------------------------------
OPTIONS PACKET
This is the packet that defines some of the user
options that drive the model. Most parameters are
used to make episode specific emission factor
adjustments. The order of the records is fixed.
The order is as follows.
1 - Char 80 - First title on reports
2 - Char 80 - Second title on reports
3 - Real 10 - Fuel RVP of gasoline for this simulation
4 - Real 10 - Oxygen weight percent of gasoline for simulation
5 - Real 10 - Percent sulfur for gasoline
6 - Real 10 - Percent sulfur for diesel
7 - Real 10 - Percent sulfur for LPG/CNG
8 - Real 10 - Minimum daily temperature (deg. F)
9 - Real 10 - maximum daily temperature (deg. F)
10 - Real 10 - Representative average daily temperature (deg. F)
11 - Char 10 - Flag to determine if region is high altitude
Valid responses are: HIGH and LOW
12 - Char 10 - Flag to determine if RFG adjustments are made
Valid responses are: YES and NO
-------------------------------------------------------
/OPTIONS/
Title 1 : PINAL COUNTY, AZ
Title 2 : DECEMBER 2008
Fuel RVP for gas : 8.8
Oxygen Weight % : 3.5
Gas sulfur % : 0.0015
Diesel sulfur % : 0.0006
Marine Dsl sulfur %: 0.0006
```

```
CNG/LPG sulfur % : 0.003
Minimum temper. (F): 41
Maximum temper. (F): 66
Average temper. (F): 54
Altitude of region : LOW
EtOH Blend % Mkt : 100
EtOH Vol % : 10
/END/
-------------------------------------------------------
REGION PACKET
This is the packet that defines the region for which
emissions are to be estimated.
The first record tells the type of region and
allocation to perform.
Valid responses are:
US TOTAL - emissions are for entire USA without state
breakout.
50STATE - emissions are for all 50 states
and Washington D.C., by state.
STATE - emissions are for a select group of states
and are state-level estimates
COUNTY - emissions are for a select group of counties
and are county level estimates. If necessary,
allocation from state to county will be performed.
SUBCOUNTY - emissions are for the specified sub counties
and are subcounty level estimates. If necessary,
county to subcounty allocation will be performed.
The remaining records define the regions to be included.
The type of data which must be specified depends on the
region level.
US TOTAL - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
50STATE - Nothing needs to be specified. The FIPS
code 00000 is used automatically.
STATE - state FIPS codes
COUNTY - state or county FIPS codes. State FIPS
code means include all counties in the
state.
SUBCOUNTY - county FIPS code and subregion code.
-------------------------------------------------------
/REGION/
Region Level : COUNTY
Pinal County AZ : 04021
/END/
or use -
Region Level : STATE
Michigan : 26000
-------------------------------------------------------
SOURCE CATEGORY PACKET
This packet is used to tell the model which source
categories are to be processed. It is optional.
If used, only those source categories list will
appear in the output data file. If the packet is
not found, the model will process all source
categories in the population files.
-------------------------------------------------------
Diesel Only -
:2270000000
:2282020000
:2285002015
Spark Ignition Only -
:2260000000
:2265000000
:2267000000
```

```
:2268000000
:2282005010
:2282005015
:2282010005
:2285004015
:2285006015
-------------------------------------------------------
This is the packet that lists the names of output files
and some of the input data files read by the model. If
a drive:\path\ is not given, the location of the
NONROAD.EXE file itself is assumed. You will probably
want to change the names of the Output and Message files
to match that of the OPTion file, e.g., MICH-97.OPT,
MICH-97.OUT, MICH-97.MSG, and if used MICH-97.AMS.
-------------------------------------------------------
/RUNFILES/
ALLOC XREF : data\allocate\allocate.xrf
ACTIVITY : data\activity\activity.dat
EXH TECHNOLOGY : data\tech\tech-exh.dat
EVP TECHNOLOGY : data\tech\tech-evp.dat
SEASONALITY : data\season\season.dat
REGIONS : data\season\season.dat
MESSAGE : c:\nonroad\outputs\p08_dec2.msg
OUTPUT DATA : c:\nonroad\outputs\p08_dec2.out
EPS2 AMS :
US COUNTIES FIPS : c:\nonroad\data\allocate\fips.dat
RETROFIT :
/END/
-------------------------------------------------------
This is the packet that defines the equipment population
files read by the model.
-------------------------------------------------------
/POP FILES/
Population File : c:\nonroad\data\pop\az.pop
/END/
POPULATION FILE : c:\nonroad\data\POP\MI.POP
-------------------------------------------------------
This is the packet that defines the growth files
files read by the model.
-------------------------------------------------------
/GROWTH FILES/
National defaults : data\growth\nation.grw
/END/
/ALLOC FILES/
Air trans. empl. :c:\nonroad\data\allocate\az_airtr.alo
Undergrnd coal prod:c:\nonroad\data\allocate\az_coal.alo
Construction cost :c:\nonroad\data\allocate\az_const.alo
Harvested acres :c:\nonroad\data\allocate\az_farms.alo
Golf course estab. :c:\nonroad\data\allocate\az_golf.alo
Wholesale estab. :c:\nonroad\data\allocate\az_holsl.alo
Family housing :c:\nonroad\data\allocate\az_house.alo
Logging employees :c:\nonroad\data\allocate\az_loggn.alo
Landscaping empl. :c:\nonroad\data\allocate\az_lscap.alo
Manufacturing empl.:c:\nonroad\data\allocate\az_mnfg.alo
Oil & gas employees:c:\nonroad\data\allocate\az_oil.alo
Census population :c:\nonroad\data\allocate\az_pop.alo
Allocation File :c:\nonroad\data\allocate\az_rail.alo
RV Park establish. :c:\nonroad\data\allocate\az_rvprk.alo
Snowblowers comm. :c:\nonroad\data\allocate\az_sbc.alo
Snowblowers res. :c:\nonroad\data\allocate\az_sbr.alo
Snowmobiles :c:\nonroad\data\allocate\az_snowm.alo
Rec marine inboard :c:\nonroad\data\allocate\az_wib.alo
Rec marine outboard:c:\nonroad\data\allocate\az_wob.alo
/END/
```

```
-------------------------------------------------------
This is the packet that defines the emssions factors
files read by the model.
-------------------------------------------------------
/EMFAC FILES/
THC exhaust : data\emsfac\exhthc.emf
CO exhaust : data\emsfac\exhco.emf
NOX exhaust : data\emsfac\exhnox.emf
PM exhaust : data\emsfac\exhpm.emf
BSFC : data\emsfac\bsfc.emf
Crankcase : data\emsfac\crank.emf
Spillage : data\emsfac\spillage.emf
Diurnal : data\emsfac\evdiu.emf
Tank Perm : data\emsfac\evtank.emf
Non-RM Hose Perm : data\emsfac\evhose.emf
RM Fill Neck Perm : data\emsfac\evneck.emf
RM Supply/Return : data\emsfac\evsupret.emf
RM Vent Perm : data\emsfac\evvent.emf
Hot Soaks : data\emsfac\evhotsk.emf
RuningLoss : data\emsfac\evrunls.emf
/END/
-------------------------------------------------------
This is the packet that defines the deterioration factors
files read by the model.
-------------------------------------------------------
/DETERIORATE FILES/
THC exhaust : data\detfac\exhthc.det
CO exhaust : data\detfac\exhco.det
NOX exhaust : data\detfac\exhnox.det
PM exhaust : data\detfac\exhpm.det
Diurnal : data\detfac\evdiu.det
Tank Perm : data\detfac\evtank.det
Non-RM Hose Perm : data\detfac\evhose.det
RM Fill Neck Perm : data\detfac\evneck.det
RM Supply/Return : data\detfac\evsupret.det
RM Vent Perm : data\detfac\evvent.det
Hot Soaks : data\detfac\evhotsk.det
RuningLoss : data\detfac\evrunls.det
/END/
Optional Packets - Add initial slash "/" to activate
/STAGE II/
Control Factor : 0
/END/
Enter percent control: 95 = 95% control = 0.05 x uncontrolled
Default should be zero control.
/MODELYEAR OUT/
EXHAUST BMY OUT :
EVAP BMY OUT :
/END/
SI REPORT/
SI report file-CSV :OUTPUTS\NRPOLLUT.CSV
/END/
/DAILY FILES/
DAILY TEMPS/RVP :
/END/
PM Base Sulfur
cols 1-10: dsl tech type;
11-20: base sulfur wt%; or '1.0' means no-adjust (cert= in-use)
/PM BASE SULFUR/
T2 0.0350 0.02247
T3 0.2000 0.02247
T3B 0.0500 0.02247
T4A 0.0500 0.02247
T4B 0.0015 0.02247
```

```
T4 0.0015 0.30
T4N 0.0015 0.30
T2M 0.0350 0.02247
T3M 1.0 0.02247
T4M 1.0 0.02247
/END/
```

BIX. Agricultural Unpaved Road Activity and Speed Notes

Notes from Pinal County Agricultural meeting on 10/21/2013

Updated 10/24/13 @ 4:15 pm to add speed assumption calculation for non-harvest operations

This meeting discussed some of the assumptions made during inventory and modeling development with the Agricultural community. The following information was clarified for ADEQ during this meeting by Dan Thelander, Kevin Rogers, and Bas Aja. Where the word "trips" are used, we are assuming a one-way trip either to or from a field. Therefore, trips are equivalent to ADT, not round-trips.

On 10/29/2008, it can be assumed that ~50% of cotton farmers were performing night tilling. We can also assume that tilling practices have not changed between 2008 and 2013. For harvesting of 100 acres of cotton, the following travel on Ag roads was given:

- Four module trucks will be needed, combining for 8 total trips at an average speed between 10 and 15 mph.
- Three pickers will be needed, combining for 6 total trips at an average speed of 10-15 mph.
- Module hauler trucks will combine for a total of 46 trips and average 30 mph.
- Maintenance/pickup trucks and watering trucks will combine for 8-10 total trips at an average speed of 30 mph.

Alfalfa harvesting generally occurs once every month and occurs over a period of four days. For harvesting of 100 acres of alfalfa, the following travel on Ag roads was given:

- Swathers combine for 3 total trips at an average speed between 10 and 15 mph.
- Bailers combine for 6 total trips at an average speed of 10-15 mph.
- Road siders will combine for a total of 2 trips and average 10-15 mph.
- Semis will combine for 8 total trips at an average speed of 25 mph.
- Squeeze will account for 2 total trips at an average speed of 30 mph.

For non-harvest operations, the farmers estimated that for a 2500 acre farm running 4 maintenance trucks at an average speed of 30 mph, each truck would log a VMT of 70 miles, for a total of 280 miles per day for non-harvest operations. In addition, tractors would account for 8 additional trips each day at a speed of 10-15 mph.

ADEQ was asked to perform calculations for non-harvest maintenance trucks using the following assumptions:

- 2500 acre farm
- 4 trucks
- 30 mph
- Truck is parked 75% of the time and driving 25% of the time OR parked 90% of the time and driving 10% of the time.
- 12 hours per day

Assuming a 75/25 split, the total daily truck mileage would be 360 miles (i.e. 90 miles/truck/day). Assuming a 90/10 split, the total daily truck mileage would be 144 miles (i.e. 36 miles/truck/day). Seeing as the farmers estimated that each truck would travel 70 miles per day and this estimation is in line with average miles of daily truck traffic calculated above, 70 miles/ truck/day will be assumed.

ADEQ was also informed that a 2500 acre farm uses four maintenance trucks; therefore, ADEQ infers that a 1336 acre farm (assumed average farm size in the EI) would use two trucks for maintenance. Based on these assumptions, an average farm would drive 140 miles per day for maintenance. Since the average percentage of ag roads, in relation to total road, on a farm was calculated by ADEQ to be 63.27%, it was determined that maintenance trucks would travel 88.58 miles (i.e. 140 miles * .6327) on Ag roads per day. ADEQ further calculated that the average total ag road length per farm is 8.695 miles. Therefore, maintenance trucks make an average of 10.19 trips (i.e. 88.58 miles of ag road driven / 8.695 of ag road on a farm) across all farm roads per day, or maintenance trucks account for 10.19 ADT. In addition, ADEQ was informed that tractors average 8 trips per day. ADEQ assumes that each trip is limited to an average of one ag road. ADEQ has calculated that there is an average of 7 ag roads on an individual farm through GIS observation sampling. Therefore, tractors account for an additional average 1.14 ADT (i.e. 8 trips / 7 ag roads per farm). If these numbers are added together, we can estimate the base, non-harvest ADT on ag roads, which is found to be 11.33 ADT (i.e. 10.19
ADT + 1.14 ADT).

Therefore, ADEQ proposes to use a base, non-harvest ADT of 11.33 for ag roads and adjust this ADT to account for additional traffic during harvest periods.

Average speed for a base, non-harvest ADT was calculated to be 28.24 mph using the equation below:

Avg = [(10.19*30)+(1.14*12.5)]/11.33

Average Agricultural Roadway Harvest ADT Increase on 10/29/2013

This document outlines the assumptions and calculations used for determining an average ADT for harvesting operations on Agricultural Roadways.

During a meeting with the Agricultural community on 10/21/2013, the following information was provided to ADEQ describing Ag road travel during the harvesting period of 10/29/2008.

- For 100 acres of cotton harvesting, the number of trips for harvesting equipment vehicles is 69 with a weighted average vehicle speed of 26.4mph.
- For 100 acres of alfalfa harvesting, the number of trips for harvesting equipment vehicles is 21 with a weighted average vehicle speed of 18.9mph.
- Harvesting 100 acres of alfalfa would take 4 days and alfalfa is harvested once per month.

ADEQ performed a survey of 20 crop fields in the Stanfield modeling domain to determine the average mileage of agricultural roads per 100 acres of cropland. This survey revealed that per 100 acres of cropland, there was an average of 2.43 miles of bordering roads, of which 1.54 miles were agricultural roads.

ADEQ has used this information to calculate an average Ag road ADT formula based on cotton and alfalfa harvesting for the 10/29/2008 design day.

Cotton Harvesting

An average farm size of 1,334 acres was assumed in the Pinal County PM_{10} Emission Inventory document. It was determined from this information that on average 100 acres or 7.5% of a farm could be harvested for cotton on any one day of the cotton harvesting season. ADEQ assumed that 25% of the roadway immediately surrounding a crop field will be accessed on average for a harvesting trip[10]. On average 69 trips are taken for 100 acres of cotton harvesting. The total mileage of Ag roadway bordering a 100 acre harvesting operation is 1.54 miles[11]. This only accounts for the mileage driven on those ag roads immediately bordering the crop field; however, the vehicles must travel to and from equipment areas and/or public roadways to access these fields. In these transport periods, ADEQ observed an average distance between public access roadways of ~1 mile. Therefore, ADEQ assumed an average access distance

traveled of 0.25 miles per trip. This means that the average total distance traveled per harvesting trip is 1.79 miles (i.e. 1.54 miles + 0.25 miles). The total estimated mileage of Ag

[10] This assumption is based on a rectangular crop field of 100 acres where, at most, an individual would need to drive 50% of the perimeter of the field to access the furthest point, and on average a driver would only need to drive halfway to the furthest point.

[11] This was determined by surveying the GIS land use layer in the Stanfield area for 20 crop fields and calculating the bordering roadway mileage to the surveyed fields. This roadway mileage was then adjusted to remove public roads and only account for agricultural roadways.

roadways in a 1,334-acre farm was calculated to be 8.7 miles. Therefore, on an average trip, 20.6% of the ag roadways are accessed (i.e. 1.79 miles / 8.7 miles).

Since ADEQ does not know which fields are harvesting on which days, an average cotton harvest ADT across ag roadways must be calculated. Therefore, ADEQ assumed that cotton harvesting would result in an increase in ADT of 14.2 (or 20.6% of 69 trips).

Alfalfa Harvesting

An average farm size of 1,334 acres was assumed in the Pinal County PM_{10} Emission Inventory document. The agricultural community informed ADEQ that harvesting of 100 acres of alfalfa would take approximately 4 days and would be performed once per month. ADEQ assumed that 25% of the roadway immediately surrounding a crop field will be accessed on average for a harvesting trip[12][3]. On average 21 trips are taken for 100 acres of alfalfa harvesting. The total mileage of Ag roadway bordering a 100 acre harvesting operation is 1.54 miles. This only accounts for the mileage driven on those ag roads immediately bordering the crop field; however, the vehicles must travel to and from equipment areas and/or public roadways to access these fields. In these transport periods, ADEQ observed an average distance between public access roadways of ~1 mile. Therefore, ADEQ estimated an average access distance traveled of 0.25 miles per trip. This means that the average total distance traveled per harvesting trip is 1.79 miles (i.e. 1.54 miles + 0.25 miles). The total calculated mileage of Ag roadways in a 1,334 farm is estimated to be 8.7 miles. Therefore, on an average trip, 20.6% of the ag roadways are accessed (i.e. 1.79 miles / 8.7 miles).

Since ADEQ does not know which fields are harvesting on which days, an average alfalfa harvest ADT across ag roadways must be calculated. While 20.6% of the ag roadways are accessed per harvesting trip, the frequency of harvesting and the number of days over which a 100 acre alfalfa field are harvested must be accounted for. Therefore, ADEQ assumed that alfalfa harvesting would result in an increase in ADT of 2.43.

$$ADT = \frac{(\%\ of\ Ag\ Roadways\ accessed) * (\#of\ trips/harvest) * (30\ day\ farm\ rotations)}{(4\ days\ per\ harvest) * (13.34\ rotations\ for\ a\ farm)}$$

Where farm rotations and rotations for a farm are dependent on the days between harvests and the average number of 100 acre plots each farm must harvest respectively.

Harvest ADT application

Above, ADEQ has estimated that Cotton Harvest increases base ADT by 14.2 and Alfalfa harvesting increases base ADT by 2.43; however, these numbers should be proportional

[12] This assumption is based on a rectangular crop field of 100 acres where, at most, an individual would need to drive 50% of the perimeter of the field to access the furthest point, and on average a driver would only need to drive halfway to the furthest point.

increases based on the percentage of cotton and alfalfa cropland within a given modeling domain. For instance, if no cotton is grown within a given modeling domain, it would stand to reason that no additional cotton harvesting ADT should be applied. Therefore, ADEQ proposes to use these ADT increases on a modeling domain basis based on the weighted average of cotton and alfalfa harvested in the given modeling domain. Below, an example of the application of this is shown for some modeling domain "X".

EXAMPLE: Assuming the crop distribution in modeling domain X is:

- 30% Cotton
- 15% Alfalfa
- 55% Other Crops

We can calculate the proportional ADT harvest increase as:

$$harvest\ ADT\ increase = (0.3 * 14.2) + (0.15 * 2.43) = 4.62$$

Assuming a base, non-harvest average ADT for Ag roads of 11.33 (calculated in "Notes from Pinal County Agricultural meeting on 10-21-2013.docx"), total average ADT is equal to:

$$total\ ADT = base\ ADT + harvest\ ADT\ increase = 11.33 + 4.62 = 15.95$$

Annual ADT Calculations

The Crop Calendar indicates cotton and alfalfa harvest activities occur on five of the seven design days (3 stagnation and 4 high wind days). The design day/modeling domains in which harvest activities occur are as follows: (1) 10/30/2008 for the Cowtown stagnation domain, (2)/(3) 10/29 for the PCH and STF stagnation modeling domains, (4) 10/27/2008 for the Maricopa high wind modeling domains, and (5) 11/21/2008 for the STF high wind modeling domain. The approaches described above were used to calculate the Ag Road Average ADT and vehicle speeds for each of these modeling domains and the results are listed below. For the PCH high wind domain (1/1/2008), the base operations vehicle speed and ADT and cotton harvesting vehicle speed and ADT were used since no alfalfa harvesting occurred on this day. For the CWT high wind domain (04/27/2008), the base operations ADT and and vehicle speed and cotton harvesting ADT and vehicle speed were used since no alfalfa harvesting occurred on this day. In case scenarios, the crop distribution within the stagnation modeling domains were used as these generally represented the largest domains and thus would best mimic the local crop distrubtion.

Cowtown Stagnation Day

Table BIX-1: Crop Distribution within the CWT Stagnation Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	3,044.9	30.5%
Cotton	622.7	6.2%
Other Crops	6,328.2	63.3%
TOTAL	9,995.8	100.0%

Table BIX-2: Estimated ADTs and Vehicle Speed within the CWT Stagnation Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	0.88	26.4
Alfalfa Harvest	0.74	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain	**12.95**	**27.6**

Pinal County Housing (PCH) Stagnation Day

Table BIX-3: Crop Distribution within the PCH Stagnation Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	1,016.8	22.1%
Cotton	1,385.2	30.0%
Other Crops	2,208.4	47.9%
TOTAL	4,610.4	100.0%

Table BIX-4: Estimated ADTs and Vehicle Speed within the PCH Stagnation Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	4.27	26.4
Alfalfa Harvest	0.54	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain	**16.13**	**27.4**

Stanfield Stagnation Day

Table BIX-5: Crop Distribution within the STF Stagnation Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	6,793.7	40.2%
Cotton	2,861.7	17.0%
Other Crops	7,226.9	42.8%
TOTAL	16,882.2	100.0%

Table BIX-6: Estimated ADTs and Vehicle Speed within the STF Stagnation Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	2.41	26.4
Alfalfa Harvest	0.98	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain[2]	**14.71**	**28.2**

Maricopa High Wind Day

Table BIX-7: Crop Distribution within the Maricopa High Wind Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	731.6	14.3%
Cotton	406.5	8.0%
Other Crops	3,969.1	77.7%
TOTAL	5,107.3	100.0%

Table BIX-8: Estimated ADTs and Vehicle Speed within the Maricopa High Wind Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	1.13	26.4
Alfalfa Harvest	0.35	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain[2]	**12.81**	**27.8**

Cowtown High Wind Day

Table BIX-9: Crop Distribution within the CWT Stagnation Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	3,044.9	30.5%
Cotton	622.7	6.2%
Other Crops	6,328.2	63.3%
TOTAL	9,995.8	100.0%

Table BIX-10: Estimated ADTs and Vehicle Speed within the CWT Stagnation Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	0.88	26.4
Alfalfa Harvest	0.74	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain	**12.07**	**27.7**

Pinal County Housing (PCH) High Wind Day

Table BIX-11: Crop Distribution within the PCH Stagnation Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	1,016.8	22.1%
Cotton	1,385.2	30.0%
Other Crops	2,208.4	47.9%
TOTAL	4,610.4	100.0%

Table BIX-12: Estimated ADTs and Vehicle Speed within the PCH Stagnation Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	4.27	26.4
Alfalfa Harvest	0.54	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain	**15.60**	**27.7**

Stanfield High Wind Day

Table BIX-13: Crop Distribution within the STF High Wind Modeling Domain		
Crop	**Acreage**	**% of modeling domain Ag land**
Alfalfa	6,793.7	40.2%
Cotton	2,861.7	17.0%
Other Crops	7,226.9	42.8%
TOTAL	16,882.2	100.0%

Table BIX-14: Estimated ADTs and Vehicle Speed within the STF High Wind Modeling Domain		
Operation	**Fractional ADT**	**Speed (mph)**
Cotton Harvest	2.41	26.4
Alfalfa Harvest	0.98	18.9
Base Operations	11.33	28.2
Ag Road Averages for Modeling Domain[2]	**14.71**	**27.3**

The following assumptions were used to calculate the annual average Ag Road harvest ADT and vehicle speed; the results are presented in the table below.

1. The crop distribution for each crop was calculated for the entire PM_{10} nonattainment area;
2. Using these crop distribution data, the crop weighted average harvesting ADTs and vehicle speed are calculated, as shown in the following table.

Table BIX-15: Annual Harvest ADT Calculation			
Crop	Percentage distribution[13]	Average Daily Traffic[14]	Speed (mph)
Cotton	35.6%	14.2	26.4
Alfalfa	30.8%	2.4	18.9
Other	26.5%	8.3	22.7
Weighted AVG.		8.0	21.2
Non-harvest		11.3	
Total Harvest		**19.3**	**21.2**

[13] The crop distribution was calculated based on the crop distribution data in 2007 Agricultural Census data, Pinal County values, and the assumption that fallow lands are 7% within the PM_{10} Nonattainment area.

[14] The Average Daily Trips (ADTs) for Cotton and Alfalfa are based on email correspondence from Bryan Paris of ADEQ dated 10/24/2013. The ADTs and vehicle speed for other Ag roads are calculated as the average of Cotton and Alfalfa ADTs and vehicle speed.

BX. Listing of Diurnal Profiles for Windblown, Activity-Based, and Total Emissions on High Wind Days

Table BX-1: 4/27/2008 Cowtown (CWT) High-wind Day Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	Desert Shrubland		Developed Rural Lands	Developed Urban Lands	Other	CAFOs	Agriculture		Unpaved Road						Total
									County	Tribal					County	Tribal	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	Test Tracks	
1	6.0	332.4	68.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.5
2	0.7	320.5	73.0	0.2	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	6.2
3	5.8	314.7	88.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.0	9.9
4	3.8	84.4	59.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.7	0.0	0.0	0.0	0.0	1.3
5	2.1	25.7	92.3	5.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.4	0.0	0.0	0.0	7.6
6	2.4	156.6	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.8	0.0	0.5	0.0	18.7	0.0	0.0	7.1	0.0	137.1
7	1.6	229.1	326.4	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	329.6	1.9	6.3	11.4	30.0	0.0	0.0	23.8	0.0	403.2
8	2.1	11.6	222.0	0.2	0.9	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	33.0	0.2	8.7	0.2	0.0	0.0	45.6
9	10.7	33.2	372.4	0.2	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.0	26.7	9.6	0.5	0.0	0.0	71.6
10	19.6	52.9	886.8	0.2	0.4	257.4	27.4	0.3	828.5	163.4	83.2	1.5	0.0	0.0	1,136.0	0.0	179.7	62.8	109.0	14.6	32.3	32.3	2,929.0
11	17.3	44.4	107.7	0.2	0.6	73.1	7.8	0.2	235.2	46.4	23.6	0.4	0.0	0.0	324.1	0.0	73.0	37.3	32.7	4.4	9.2	9.2	877.4
12	15.4	43.0	122.3	0.2	0.6	31.0	3.3	0.3	99.8	19.7	10.0	0.2	0.0	0.0	138.9	0.0	49.4	39.3	18.0	2.1	3.9	3.9	420.6
13	17.4	37.0	72.0	0.2	0.8	68.2	7.3	0.2	219.6	43.3	22.0	0.4	0.0	0.0	302.9	0.0	67.5	37.4	41.4	4.1	8.6	8.6	832.4
14	14.5	44.0	38.4	0.2	0.7	22.7	2.5	0.3	79.8	15.7	8.0	0.1	0.0	0.0	106.4	0.0	43.0	36.2	15.3	1.6	2.8	2.8	338.1
15	15.8	49.6	36.4	0.2	0.7	27.3	2.9	0.2	87.7	17.3	8.8	0.2	0.0	0.0	121.7	0.0	44.8	38.8	16.7	2.0	3.4	3.4	376.0
16	14.9	50.7	23.1	0.2	1.4	18.4	2.1	0.2	64.8	12.8	6.5	0.1	0.0	0.0	86.5	0.0	39.9	36.8	13.0	1.5	2.3	2.3	288.7
17	11.9	59.4	69.7	0.2	0.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	29.7	32.9	5.2	0.6	0.0	0.0	70.4
18	9.0	68.9	101.2	0.0	0.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	25.0	33.7	4.4	0.2	0.9	0.0	66.3
19	5.2	40.9	230.1	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	12.8	3.4	0.0	0.0	0.0	17.5
20	4.0	8.0	72.9	0.2	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	10.3	0.0	0.0	0.0	11.7
21	2.9	37.2	79.7	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.4	10.5	0.0	0.0	0.0	17.2
22	3.0	35.3	42.6	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	4.7	2.7	0.0	0.0	0.0	8.6
23	3.8	111.6	232.5	0.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	4.7	1.9	0.0	0.1	0.0	8.9
24	3.2	9.3	127.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0
Average			168.3	0.3	0.6	20.8	2.2	0.1	67.3	13.3	6.8	0.1	0.0	18.9	92.9	0.3	26.1	19.1	12.8	1.3	3.9	2.6	289.5
Percentage Contribution				0.1%	0.2%	7.2%	0.8%	0.1%	23.3%	4.6%	2.3%	0.0%	0.0%	6.5%	32.1%	0.1%	9.0%	6.6%	4.4%	0.5%	1.4%	0.9%	100%

Table BX-2: 4/27/2008 Cowtown (CWT) High-wind Day Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	Desert Shrubland		Developed Rural Lands	Developed Urban Lands	Other	CAFOs	Agriculture		Unpaved Road						Total
									County	Tribal					Non_Tribal	Tribal	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	Test Tracks	
1	6.0	332.4	68.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.7	320.5	73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	5.8	314.7	88.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	3.8	84.4	59.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	2.1	25.7	92.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	2.4	156.6	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1.6	229.1	326.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	2.1	11.6	222.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	10.7	33.2	372.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	19.6	52.9	886.8	0.0	0.0	257.4	27.4	0.0	828.5	163.4	83.2	1.5	0.0	0.0	1,134.5	0.0	151.2	28.0	102.5	14.0	0.0	32.3	2,824.0
11	17.3	44.4	107.7	0.0	0.0	73.1	7.8	0.0	235.2	46.4	23.6	0.4	0.0	0.0	322.1	0.0	42.9	8.0	29.1	4.0	0.0	9.2	801.9
12	15.4	43.0	122.3	0.0	0.0	31.0	3.3	0.0	99.8	19.7	10.0	0.2	0.0	0.0	136.7	0.0	18.2	3.4	12.4	1.7	0.0	3.9	340.3
13	17.4	37.0	72.0	0.0	0.0	68.2	7.3	0.0	219.6	43.3	22.0	0.4	0.0	0.0	300.7	0.0	40.1	7.4	27.2	3.7	0.0	8.6	748.4
14	14.5	44.0	38.4	0.0	0.0	22.7	2.5	0.0	79.8	15.7	8.0	0.1	0.0	0.0	104.5	0.0	12.9	2.4	8.8	1.2	0.0	2.8	261.5
15	15.8	49.6	36.4	0.0	0.0	27.3	2.9	0.0	87.7	17.3	8.8	0.2	0.0	0.0	120.1	0.0	16.0	3.0	10.9	1.5	0.0	3.4	299.1
16	14.9	50.7	23.1	0.0	0.0	18.4	2.1	0.0	64.8	12.8	6.5	0.1	0.0	0.0	84.9	0.0	10.5	2.0	7.1	1.0	0.0	2.3	212.4
17	11.9	59.4	69.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	9.0	68.9	101.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	5.2	40.9	230.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	4.0	8.0	72.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	2.9	37.2	79.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	3.0	35.3	42.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	3.8	111.6	232.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	3.2	9.3	127.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			168.3	0.0	0.0	20.8	2.2	0.0	67.3	13.3	6.8	0.1	0.0	0.0	91.8	0.0	12.2	2.3	8.2	1.1	0.0	2.6	228.7
Percentage Contribution				0.0%	0.0%	9.1%	1.0%	0.0%	29.4%	5.8%	3.0%	0.1%	0.0%	0.0%	40.2%	0.0%	5.3%	1.0%	3.6%	0.5%	0.0%	1.1%	100%

Table BX-3: 4/27/2008 Cowtown (CWT) High-wind Day Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	Desert Shrubland		Developed Rural Lands	Developed Urban Lands	Other	CAFOs	Agriculture		Unpaved Road						Total
									Non_Tribal	Tribal					County	Tribal	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	Test Tracks	
1	6.0	332.4	68.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.5
2	0.7	320.5	73.0	0.2	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	6.2
3	5.8	314.7	88.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.0	9.9
4	3.8	84.4	59.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.7	0.0	0.0	0.0	0.0	1.3
5	2.1	25.7	92.3	5.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.4	0.0	0.0	0.0	7.6
6	2.4	156.6	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.8	0.0	0.5	0.0	18.7	0.0	0.0	7.1	0.0	137.1
7	1.6	229.1	326.4	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	329.6	1.9	6.3	11.4	30.0	0.0	0.0	23.8	0.0	403.2
8	2.1	11.6	222.0	0.2	0.9	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	33.0	0.2	8.7	0.2	0.0	0.0	45.6
9	10.7	33.2	372.4	0.2	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.0	26.7	9.6	0.5	0.0	0.0	71.6
10	19.6	52.9	886.8	0.2	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	28.5	34.8	6.5	0.6	0.0	0.0	72.7
11	17.3	44.4	107.7	0.2	0.6	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	30.1	29.3	3.6	0.4	0.0	0.0	66.4
12	15.4	43.0	122.3	0.2	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.2	35.9	5.6	0.4	0.0	0.0	76.4
13	17.4	37.0	72.0	0.2	0.8	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	27.4	30.0	14.2	0.4	0.0	0.0	75.4
14	14.5	44.0	38.4	0.2	0.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	30.1	33.8	6.5	0.4	0.0	0.0	73.9
15	15.8	49.6	36.4	0.2	0.7	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	28.8	35.8	5.8	0.5	0.0	0.0	73.5
16	14.9	50.7	23.1	0.2	1.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	29.4	34.8	5.9	0.5	0.0	0.0	74.0
17	11.9	59.4	69.7	0.2	0.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	29.7	32.9	5.2	0.6	0.0	0.0	70.4
18	9.0	68.9	101.2	0.0	0.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	25.0	33.7	4.4	0.2	0.9	0.0	66.3
19	5.2	40.9	230.1	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	12.8	3.4	0.0	0.0	0.0	17.5
20	4.0	8.0	72.9	0.2	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	10.3	0.0	0.0	0.0	11.7
21	2.9	37.2	79.7	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.4	10.5	0.0	0.0	0.0	17.2
22	3.0	35.3	42.6	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	4.7	2.7	0.0	0.0	0.0	8.6
23	3.8	111.6	232.5	0.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	4.7	1.9	0.0	0.1	0.0	8.9
24	3.2	9.3	127.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0
Average			168.3	0.3	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	18.9	1.1	0.3	14.0	16.9	4.5	0.2	1.3	0.0	58.2
Percentage Contribution				0.6%	1.1%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	32.4%	1.8%	0.5%	24.0%	29.0%	7.8%	0.3%	2.3%	0.0%	100.0%

Table BX-4: 10/27/2008 Maricopa (MC) High-wind Day Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	WSPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	Agriculture		Unpaved Road					Total
													County	Tribal Land	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	
1	4.5	160.0	239.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	1.4
2	2.4	106.0	143.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	1.2
3	1.6	6.0	70.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.7
4	1.6	348.0	73.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
5	2.9	290.0	98.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1.1
6	2.4	241.0	91.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.1
7	1.6	215.0	129.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	21.8	26.1
8	6.9	82.0	160.4	4.6	119.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	11.0	2.9	1.3	0.1	0.0	142.5
9	16.0	84.0	326.2	4.5	316.7	0.0	57.0	1.9	32.7	24.0	23.8	3.2	72.6	0.0	17.9	3.7	7.4	0.4	0.0	565.6
10	20.7	85.0	852.9	4.4	1,455.1	0.0	345.9	2.2	190.6	139.7	155.0	18.8	428.8	0.0	57.8	10.7	40.1	2.0	0.0	2,851.1
11	23.6	81.0	496.5	4.2	1,356.0	0.0	319.1	2.1	175.9	128.9	143.0	17.4	395.7	0.0	54.8	9.6	36.1	1.9	0.0	2,644.6
12	21.0	82.0	293.2	4.5	791.4	0.0	173.3	2.3	95.5	70.0	77.7	9.4	215.3	0.0	34.8	7.1	21.8	1.0	0.0	1,504.0
13	21.9	79.0	176.0	4.9	584.0	0.0	120.0	2.1	66.1	48.4	53.8	6.5	149.3	0.0	27.6	5.4	15.0	0.7	0.0	1,083.9
14	21.6	74.0	141.9	4.5	524.1	0.0	93.3	2.2	51.4	37.7	41.8	5.1	116.3	0.1	22.2	4.0	11.5	0.6	0.0	914.7
15	19.9	72.0	84.8	4.5	335.0	0.0	45.5	1.9	26.1	19.2	19.0	2.5	58.2	0.1	14.9	0.9	5.7	0.3	0.0	533.9
16	17.6	71.0	76.6	4.5	257.7	0.0	24.6	1.9	14.1	10.4	10.3	1.4	31.9	0.1	12.0	0.5	3.4	0.1	0.0	372.9
17	16.0	72.0	68.6	5.3	201.8	0.0	9.5	1.8	5.5	4.0	4.0	0.5	12.8	0.1	10.3	0.2	1.9	0.1	0.0	257.7
18	10.8	62.0	60.4	4.0	0.0	0.0	0.0	1.7	0.0	0.0	0.7	0.1	0.6	0.3	6.7	0.0	1.0	0.0	1.7	16.7
19	8.8	61.0	56.2	4.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.4	5.6
20	9.1	68.0	45.1	2.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	3.7
21	11.9	70.0	36.1	2.4	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	3.2
22	12.2	80.0	30.8	2.7	6.4	0.0	1.8	0.1	1.1	0.8	0.7	0.1	2.3	0.0	0.2	0.5	0.6	0.0	0.0	17.4
23	11.3	82.0	33.2	1.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	2.6
24	11.1	78.0	38.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	1.5
Average			159.4	2.9	247.8	0.0	49.6	1.0	27.5	20.1	22.1	2.7	61.9	0.1	11.3	2.0	6.2	0.3	1.1	456.5
Percentage Contribution				0.6%	54.3%	0.0%	10.9%	0.2%	6.0%	4.4%	4.8%	0.6%	13.6%	0.0%	2.5%	0.4%	1.4%	0.1%	0.2%	100%

Table BX-5: 10/27/2008 Maricopa (MC) High-wind Day Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	Agriculture		Unpaved Road					Total
													County	Tribal Land	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	
1	4.5	160.0	239.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2.4	106.0	143.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1.6	6.0	70.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1.6	348.0	73.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	2.9	290.0	98.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	2.4	241.0	91.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1.6	215.0	129.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	6.9	82.0	160.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	16.0	84.0	326.2	0.0	210.7	0.0	57.0	0.0	32.7	24.0	23.8	3.2	71.9	0.0	7.3	1.2	5.6	0.3	0.0	437.6
10	20.7	85.0	852.9	0.0	1,340.2	0.0	345.9	0.0	190.6	139.7	155.0	18.8	428.0	0.0	47.4	7.5	36.7	2.0	0.0	2,711.8
11	23.6	81.0	496.5	0.0	1,236.6	0.0	319.1	0.0	175.9	128.9	143.0	17.4	394.9	0.0	43.8	6.9	33.9	1.8	0.0	2,502.1
12	21.0	82.0	293.2	0.0	671.5	0.0	173.3	0.0	95.5	70.0	77.7	9.4	214.5	0.0	23.8	3.7	18.4	1.0	0.0	1,358.8
13	21.9	79.0	176.0	0.0	464.9	0.0	120.0	0.0	66.1	48.4	53.8	6.5	148.5	0.0	16.5	2.6	12.7	0.7	0.0	940.7
14	21.6	74.0	141.9	0.0	361.6	0.0	93.3	0.0	51.4	37.7	41.8	5.1	115.5	0.0	12.8	2.0	9.9	0.5	0.0	731.7
15	19.9	72.0	84.8	0.0	168.3	0.0	45.5	0.0	26.1	19.2	19.0	2.5	57.4	0.0	5.8	0.9	4.5	0.2	0.0	349.5
16	17.6	71.0	76.6	0.0	91.0	0.0	24.6	0.0	14.1	10.4	10.3	1.4	31.0	0.0	3.1	0.5	2.4	0.1	0.0	189.0
17	16.0	72.0	68.6	0.0	35.1	0.0	9.5	0.0	5.5	4.0	4.0	0.5	12.0	0.0	1.2	0.2	0.9	0.1	0.0	72.9
18	10.8	62.0	60.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
19	8.8	61.0	56.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	9.1	68.0	45.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	11.9	70.0	36.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	12.2	80.0	30.8	0.0	6.4	0.0	1.8	0.0	1.1	0.8	0.7	0.1	2.3	0.0	0.2	0.0	0.2	0.0	0.0	13.7
23	11.3	82.0	33.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	11.1	78.0	38.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			159.4	0.0	191.1	0.0	49.6	0.0	27.5	20.1	22.0	2.7	61.5	0.0	6.7	1.1	5.2	0.3	0.0	387.8
Percentage Contribution				0.0%	41.9%	0.0%	10.9%	0.0%	6.0%	4.4%	4.8%	0.6%	13.5%	0.0%	1.5%	0.2%	1.1%	0.1%	0.0%	85.0%

Table BX-6: 10/27/2008 Maricopa (MC) High-wind Day Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	Agriculture		Unpaved Road					Total
													County	Tribal Land	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	
1	4.5	160.0	239.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	1.4
2	2.4	106.0	143.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	1.2
3	1.6	6.0	70.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.7
4	1.6	348.0	73.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
5	2.9	290.0	98.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1.1
6	2.4	241.0	91.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.1
7	1.6	215.0	129.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	21.8	26.1
8	6.9	82.0	160.4	4.6	119.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	11.0	2.9	1.3	0.1	0.0	142.5
9	16.0	84.0	326.2	4.5	106.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	10.6	2.5	1.7	0.1	0.0	128.1
10	20.7	85.0	852.9	4.4	114.9	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.8	0.0	10.4	3.2	3.4	0.1	0.0	139.3
11	23.6	81.0	496.5	4.2	119.4	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.8	0.0	11.0	2.7	2.2	0.1	0.0	142.5
12	21.0	82.0	293.2	4.5	119.9	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.8	0.0	11.0	3.4	3.4	0.1	0.0	145.3
13	21.9	79.0	176.0	4.9	119.1	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.8	0.0	11.1	2.8	2.3	0.1	0.0	143.2
14	21.6	74.0	141.9	4.5	162.5	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.8	0.1	9.4	2.0	1.6	0.0	0.0	183.1
15	19.9	72.0	84.8	4.5	166.7	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.1	9.1	0.0	1.2	0.0	0.0	184.4
16	17.6	71.0	76.6	4.5	166.7	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.1	8.8	0.0	1.0	0.0	0.0	183.9
17	16.0	72.0	68.6	5.3	166.7	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.8	0.1	9.1	0.0	0.9	0.0	0.0	184.7
18	10.8	62.0	60.4	4.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.6	0.3	6.5	0.0	0.8	0.0	1.7	15.5
19	8.8	61.0	56.2	4.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.4	5.6
20	9.1	68.0	45.1	2.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	3.7
21	11.9	70.0	36.1	2.4	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	3.2
22	12.2	80.0	30.8	2.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	3.7
23	11.3	82.0	33.2	1.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	2.6
24	11.1	78.0	38.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	1.5
RSQR				0.1	0.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.5	0.6	0.4	0.0	0.2
Average			159.4	2.9	56.7	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.4	0.1	4.5	0.9	1.0	0.0	1.1	68.6
Percentage Contribution				4.3%	82.7%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.5%	0.2%	6.6%	1.3%	1.5%	0.0%	1.6%	15%

Table BX-7: 1/1/2008 Pinal County Housing (PCH) High-wind Day Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Permitted Point Sources	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Unpaved Road				Total
												AG Road	Public Dirt	Private Dirt	Trail	
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.2	0.0	2.6
2	1.5	318.0	21.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	0.0	3.6
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	0.0	2.4
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.5
5	5.9	352.2	16.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.2	0.0	2.8
6	3.1	299.6	19.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	13.0	2.7	0.0	15.9
7	3.9	339.3	16.2	0.1	0.0	1.6	0.0	0.0	0.0	0.0	12.8	46.2	13.1	10.2	0.9	85.0
8	5.7	5.0	22.7	1.3	0.0	0.9	0.0	0.0	0.0	0.0	14.1	61.2	13.2	5.2	0.1	96.0
9	4.8	53.9	34.7	0.7	0.0	0.5	0.0	0.0	0.0	0.0	15.2	60.8	22.2	9.8	0.4	109.6
10	16.2	41.2	871.2	0.6	0.0	0.7	16.2	60.2	29.1	2.5	473.1	96.9	33.8	31.2	6.3	750.7
11	21.3	46.3	919.3	0.6	0.0	0.5	67.0	238.9	115.6	11.0	2,050.3	231.1	65.9	57.5	26.5	2,865.0
12	24.9	49.6	1,136.1	0.4	0.0	0.6	221.0	787.7	381.0	36.2	6,735.9	621.1	191.0	163.3	86.5	9,224.7
13	23.4	48.5	790.7	0.4	0.0	0.5	91.3	325.4	157.4	15.0	2,790.1	291.0	91.0	74.8	36.0	3,873.0
14	22.8	48.3	946.1	0.4	0.0	0.6	48.5	172.8	83.6	8.0	1,487.8	182.8	61.7	56.7	19.3	2,122.3
15	19.1	47.6	320.0	0.5	0.0	0.5	23.7	87.9	42.5	3.6	686.7	115.2	45.2	34.5	9.0	1,049.3
16	22.1	53.6	397.9	0.8	0.0	0.5	45.3	161.7	78.2	7.4	1,394.8	176.6	64.8	47.7	18.1	1,995.9
17	19.8	53.6	281.9	0.8	0.0	0.5	26.4	98.0	47.4	4.0	768.7	123.6	48.0	29.2	10.0	1,156.7
18	15.0	50.6	65.8	0.7	0.0	0.6	7.3	28.1	13.6	1.0	207.5	76.4	30.8	16.3	2.8	385.1
19	15.5	54.6	50.9	0.8	0.0	0.1	4.1	15.2	7.3	0.6	116.6	9.7	17.5	14.3	1.5	187.6
20	19.2	58.1	61.5	0.6	0.0	0.1	10.0	37.2	18.0	1.5	285.8	23.8	15.7	14.9	3.6	411.2
21	19.2	56.7	70.6	0.4	0.0	0.1	9.1	33.8	16.4	1.4	259.8	21.7	15.6	15.7	3.3	377.2
22	19.0	57.4	67.6	0.4	0.0	0.0	7.3	27.0	13.1	1.1	207.8	17.3	12.8	7.2	2.6	296.7
23	17.1	55.7	32.7	0.2	0.0	0.0	3.5	12.8	6.2	0.5	98.7	8.2	7.5	4.6	1.3	143.7
24	14.8	54.6	139.3	0.1	0.0	0.0	3.4	13.0	6.3	0.5	89.3	7.4	5.6	2.7	1.1	129.3
Average			264.9	0.4	0.0	0.4	24.3	87.5	42.3	3.9	737.3	90.5	32.4	25.1	9.6	1,053.7
Percentage Contribution				0.0%	0.0%	0.0%	2.3%	8.3%	4.0%	0.4%	70.0%	8.6%	3.1%	2.4%	0.9%	100%

Table BX-8: 1/1/2008 Pinal County Housing (PCH) High-wind Day Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Permitted Point Sources	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Unpaved Road				Total
												AG Road	Public Dirt	Private Dirt	Trail	
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.5	318.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	5.9	352.2	16.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.1	299.6	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	3.9	339.3	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	5.7	5.0	22.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	4.8	53.9	34.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	16.2	41.2	871.2	0.0	0.0	0.0	16.2	60.2	29.1	2.5	462.8	38.6	11.4	9.7	5.9	636.5
11	21.3	46.3	919.3	0.0	0.0	0.0	67.0	238.9	115.6	11.0	2,039.0	171.1	50.2	43.2	26.1	2,762.3
12	24.9	49.6	1,136.1	0.0	0.0	0.0	221.0	787.7	381.0	36.2	6,722.1	564.1	165.7	142.4	86.1	9,106.3
13	23.4	48.5	790.7	0.0	0.0	0.0	91.3	325.4	157.4	15.0	2,777.0	233.1	68.4	58.8	35.6	3,762.0
14	22.8	48.3	946.1	0.0	0.0	0.0	48.5	172.8	83.6	8.0	1,474.7	123.8	36.3	31.2	18.9	1,997.7
15	19.1	47.6	320.0	0.0	0.0	0.0	23.7	87.9	42.5	3.6	675.5	56.3	16.7	14.2	8.6	929.0
16	22.1	53.6	397.9	0.0	0.0	0.0	45.3	161.7	78.2	7.4	1,379.6	115.8	34.0	29.2	17.7	1,868.9
17	19.8	53.6	281.9	0.0	0.0	0.0	26.4	98.0	47.4	4.0	753.5	62.8	18.6	15.8	9.6	1,036.1
18	15.0	50.6	65.8	0.0	0.0	0.0	7.3	28.1	13.6	1.0	193.5	16.0	4.8	4.0	2.4	270.8
19	15.5	54.6	50.9	0.0	0.0	0.0	4.1	15.2	7.3	0.6	116.6	9.7	2.9	2.5	1.5	160.4
20	19.2	58.1	61.5	0.0	0.0	0.0	10.0	37.2	18.0	1.5	285.8	23.8	7.0	6.0	3.6	393.0
21	19.2	56.7	70.6	0.0	0.0	0.0	9.1	33.8	16.4	1.4	259.8	21.7	6.4	5.5	3.3	357.3
22	19.0	57.4	67.6	0.0	0.0	0.0	7.3	27.0	13.1	1.1	207.8	17.3	5.1	4.4	2.6	285.8
23	17.1	55.7	32.7	0.0	0.0	0.0	3.5	12.8	6.2	0.5	98.7	8.2	2.4	2.1	1.3	135.8
24	14.8	54.6	139.3	0.0	0.0	0.0	3.4	13.0	6.3	0.5	89.3	7.4	2.2	1.9	1.1	125.0
Average			264.9	0.0	0.0	0.0	24.3	87.5	42.3	3.9	730.7	61.2	18.0	15.5	9.3	992.8
Percentage Contribution				0.0%	0.0%	0.0%	2.5%	8.8%	4.3%	0.4%	73.6%	6.2%	1.8%	1.6%	0.9%	100%

Table BX-9: 1/1/2008 Pinal County Housing (PCH) High-wind Day Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Permitted Point Sources	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Unpaved Road				Total
												AG Road	Public Dirt	Private Dirt	Trail	
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.2	0.0	2.6
2	1.5	318.0	21.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	0.0	3.6
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	0.0	2.4
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.5
5	5.9	352.2	16.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.2	0.0	2.8
6	3.1	299.6	19.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	13.0	2.7	0.0	15.9
7	3.9	339.3	16.2	0.1	0.0	1.6	0.0	0.0	0.0	0.0	12.8	46.2	13.1	10.2	0.9	85.0
8	5.7	5.0	22.7	1.3	0.0	0.9	0.0	0.0	0.0	0.0	14.1	61.2	13.2	5.2	0.1	96.0
9	4.8	53.9	34.7	0.7	0.0	0.5	0.0	0.0	0.0	0.0	15.2	60.8	22.2	9.8	0.4	109.6
10	16.2	41.2	871.2	0.6	0.0	0.7	0.0	0.0	0.0	0.0	10.2	58.3	22.4	21.5	0.4	114.2
11	21.3	46.3	919.3	0.6	0.0	0.5	0.0	0.0	0.0	0.0	11.2	60.0	15.7	14.3	0.4	102.7
12	24.9	49.6	1,136.1	0.4	0.0	0.6	0.0	0.0	0.0	0.0	13.9	57.0	25.3	20.9	0.4	118.4
13	23.4	48.5	790.7	0.4	0.0	0.5	0.0	0.0	0.0	0.0	13.1	58.0	22.6	16.0	0.4	111.0
14	22.8	48.3	946.1	0.4	0.0	0.6	0.0	0.0	0.0	0.0	13.1	59.1	25.4	25.5	0.4	124.5
15	19.1	47.6	320.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	11.2	58.9	28.5	20.3	0.4	120.3
16	22.1	53.6	397.9	0.8	0.0	0.5	0.0	0.0	0.0	0.0	15.2	60.8	30.8	18.5	0.4	127.0
17	19.8	53.6	281.9	0.8	0.0	0.5	0.0	0.0	0.0	0.0	15.2	60.8	29.4	13.4	0.4	120.6
18	15.0	50.6	65.8	0.7	0.0	0.6	0.0	0.0	0.0	0.0	14.0	60.4	26.0	12.3	0.3	114.3
19	15.5	54.6	50.9	0.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	14.6	11.8	0.0	27.3
20	19.2	58.1	61.5	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	8.7	8.9	0.0	18.2
21	19.2	56.7	70.6	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	9.2	10.2	0.0	19.9
22	19.0	57.4	67.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	2.8	0.0	10.9
23	17.1	55.7	32.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	2.5	0.0	7.9
24	14.8	54.6	139.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.8	0.0	4.4
Average			264.9	0.4	0.0	0.4	0.0	0.0	0.0	0.0	6.6	29.2	14.4	9.7	0.2	60.9
Percentage Contribution				0.7%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	10.9%	48.0%	23.6%	15.9%	0.3%	100%

Table BX-10: 11/21/2008 Stanfield (STF) High-wind Day Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	WSPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Dairies	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	3.5	119.2	112.4	0.1	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	3.8
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2	0.0	2.0
3	3.4	117.3	157.4	0.1	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.2	0.0	6.5
4	3.7	125.4	158.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
5	3.2	274.2	102.3	0.2	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	31.3
6	3.4	240.9	234.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.2	0.0	4.8
7	13.2	85.5	357.4	1.1	0.0	47.2	0.0	8.2	0.4	60.1	12.3	239.2	58.9	24.3	10.9	7.0	469.6
8	14.7	81.9	326.6	1.6	0.0	50.3	0.0	9.3	0.4	68.2	13.9	270.6	63.4	33.0	10.1	8.0	528.7
9	16.3	82.2	584.6	1.5	0.0	121.2	0.0	33.2	0.4	233.3	47.7	987.2	107.6	37.7	31.6	25.8	1,627.2
10	16.0	81.1	429.2	1.0	0.0	62.6	0.0	13.1	0.5	91.9	18.8	394.8	71.1	31.9	18.2	11.8	715.7
11	16.0	80.2	334.3	1.0	0.0	35.1	0.0	11.3	0.4	79.3	16.2	342.3	63.7	28.2	14.2	10.5	602.3
12	14.6	80.4	186.1	1.1	0.0	32.8	0.0	4.8	0.5	34.8	7.1	143.3	51.1	30.4	11.2	5.5	322.5
13	12.2	79.2	93.9	1.2	0.0	7.5	0.0	2.1	0.4	15.4	3.2	68.5	46.9	26.8	7.0	3.7	182.8
14	11.1	78.5	65.1	1.2	0.0	1.7	0.0	0.0	0.5	0.0	0.0	9.4	43.8	29.9	8.6	2.3	97.3
15	10.2	75.3	64.8	0.6	0.0	1.7	0.0	0.0	0.5	0.0	0.0	9.1	44.8	38.0	6.8	2.4	103.8
16	8.2	77.2	65.2	1.8	0.0	2.3	0.0	0.0	0.5	0.0	0.0	8.8	43.9	38.8	7.3	2.3	105.6
17	5.9	74.7	87.1	1.3	0.0	2.8	0.0	0.0	0.4	0.0	0.0	9.5	44.8	40.3	5.3	2.4	106.8
18	4.0	73.8	104.6	1.3	0.0	4.0	0.0	0.0	0.4	0.0	0.0	9.7	45.4	36.3	4.4	2.5	104.0
19	5.3	75.1	88.3	0.7	0.0	5.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	20.6	4.6	0.0	31.1
20	4.6	86.2	56.1	1.0	0.0	44.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	3.5	0.0	60.1
21	2.3	158.4	98.3	0.1	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	7.5	0.8	0.0	8.8
22	1.9	230.2	249.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.9	0.0	3.3
23	2.5	270.1	171.6	0.6	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	10.4
24	2.1	291.4	99.5	0.0	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	9.5
Average			178.6	0.8	0.0	19.8	0.0	3.4	0.2	24.3	5.0	103.8	28.6	18.5	6.3	3.5	214.1
Percentage Contribution				0.4%	0.0%	9.2%	0.0%	1.6%	0.1%	11.3%	2.3%	48.5%	13.3%	8.6%	2.9%	1.6%	100%

Table BX-11: 11/21/2008 Stanfield (STF) High-wind Day Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Dairies	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	3.5	119.2	112.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3.4	117.3	157.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	3.7	125.4	158.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	3.2	274.2	102.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.4	240.9	234.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	13.2	85.5	357.4	0.0	0.0	22.6	0.0	8.2	0.0	60.1	12.3	229.8	13.9	2.9	6.3	5.5	361.7
8	14.7	81.9	326.6	0.0	0.0	25.7	0.0	9.3	0.0	68.2	13.9	260.8	15.8	3.3	7.2	6.3	410.5
9	16.3	82.2	584.6	0.0	0.0	96.6	0.0	33.2	0.0	233.3	47.7	977.4	60.8	12.4	27.7	24.1	1,513.3
10	16.0	81.1	429.2	0.0	0.0	38.0	0.0	13.1	0.0	91.9	18.8	385.0	24.0	4.9	10.9	9.5	596.1
11	16.0	80.2	334.3	0.0	0.0	32.8	0.0	11.3	0.0	79.3	16.2	332.3	20.7	4.2	9.4	8.2	514.5
12	14.6	80.4	186.1	0.0	0.0	13.1	0.0	4.8	0.0	34.8	7.1	133.3	8.1	1.7	3.7	3.2	209.8
13	12.2	79.2	93.9	0.0	0.0	5.8	0.0	2.1	0.0	15.4	3.2	59.1	3.6	0.7	1.6	1.4	93.0
14	11.1	78.5	65.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	10.2	75.3	64.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	8.2	77.2	65.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	5.9	74.7	87.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	4.0	73.8	104.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	5.3	75.1	88.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	4.6	86.2	56.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	2.3	158.4	98.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	1.9	230.2	249.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	2.5	270.1	171.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	2.1	291.4	99.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			178.6	0.0	0.0	9.8	0.0	3.4	0.0	24.3	5.0	99.1	6.1	1.3	2.8	2.4	154.1
Percentage Contribution				0.0%	0.0%	6.3%	0.0%	2.2%	0.0%	15.8%	3.2%	64.3%	4.0%	0.8%	1.8%	1.6%	100%

Table BX-12: 11/21/2008 Stanfield (STF) High-wind Day Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Dairies	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	3.5	119.2	112.4	0.1	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	3.8
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2	0.0	2.0
3	3.4	117.3	157.4	0.1	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.2	0.0	6.5
4	3.7	125.4	158.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
5	3.2	274.2	102.3	0.2	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	31.3
6	3.4	240.9	234.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.2	0.0	4.8
7	13.2	85.5	357.4	1.1	0.0	24.6	0.0	0.0	0.4	0.0	0.0	9.3	45.0	21.4	4.6	1.5	107.9
8	14.7	81.9	326.6	1.6	0.0	24.6	0.0	0.0	0.4	0.0	0.0	9.8	47.6	29.7	2.9	1.7	118.3
9	16.3	82.2	584.6	1.5	0.0	24.6	0.0	0.0	0.4	0.0	0.0	9.8	46.7	25.3	3.9	1.7	113.9
10	16.0	81.1	429.2	1.0	0.0	24.6	0.0	0.0	0.5	0.0	0.0	9.8	47.1	27.0	7.3	2.3	119.6
11	16.0	80.2	334.3	1.0	0.0	2.3	0.0	0.0	0.4	0.0	0.0	9.9	43.0	24.0	4.8	2.3	87.8
12	14.6	80.4	186.1	1.1	0.0	19.7	0.0	0.0	0.5	0.0	0.0	9.9	43.0	28.7	7.5	2.3	112.7
13	12.2	79.2	93.9	1.2	0.0	1.7	0.0	0.0	0.4	0.0	0.0	9.4	43.3	26.1	5.4	2.3	89.8
14	11.1	78.5	65.1	1.2	0.0	1.7	0.0	0.0	0.5	0.0	0.0	9.4	43.8	29.9	8.6	2.3	97.3
15	10.2	75.3	64.8	0.6	0.0	1.7	0.0	0.0	0.5	0.0	0.0	9.1	44.8	38.0	6.8	2.4	103.8
16	8.2	77.2	65.2	1.8	0.0	2.3	0.0	0.0	0.5	0.0	0.0	8.8	43.9	38.8	7.3	2.3	105.6
17	5.9	74.7	87.1	1.3	0.0	2.8	0.0	0.0	0.4	0.0	0.0	9.5	44.8	40.3	5.3	2.4	106.8
18	4.0	73.8	104.6	1.3	0.0	4.0	0.0	0.0	0.4	0.0	0.0	9.7	45.4	36.3	4.4	2.5	104.0
19	5.3	75.1	88.3	0.7	0.0	5.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	20.6	4.6	0.0	31.1
20	4.6	86.2	56.1	1.0	0.0	44.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	3.5	0.0	60.1
21	2.3	158.4	98.3	0.1	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	7.5	0.8	0.0	8.8
22	1.9	230.2	249.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.9	0.0	3.3
23	2.5	270.1	171.6	0.6	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	10.4
24	2.1	291.4	99.5	0.0	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	9.5
Average			178.6	0.8	0.0	10.0	0.0	0.0	0.2	0.0	0.0	4.8	22.4	17.2	3.5	1.1	60.0
Percentage Contribution				1.3%	0.0%	16.6%	0.0%	0.0%	0.4%	0.0%	0.0%	7.9%	37.4%	28.7%	5.8%	1.8%	100%

Table BX-13: 4/27/2018 Cowtown (CWT) High-wind Day Projected Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	WSPD mph (H=10m)	WD	PM10 Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	Desert Shrubland		Developed Rural Lands	Developed Urban Lands	Other	CAFOs	Agriculture		Unpaved Road						Total
									County	Tribal					County	Tribal	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	Test Tracks	
1	6.0	332.4	68.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	1.0
2	0.7	320.5	73.0	1.0	1.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	3.2
3	5.8	314.7	88.1	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0	2.6
4	3.8	84.4	59.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.5
5	2.1	25.7	92.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0	2.7
6	2.4	156.6	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	21.8	0.0	0.0	8.2	0.0	30.7
7	1.6	229.1	326.4	0.3	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	329.6	1.9	6.3	11.4	35.1	0.0	0.0	25.6	0.0	410.6
8	2.1	11.6	222.0	1.4	1.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	33.0	0.2	10.2	0.2	0.0	0.0	49.0
9	10.7	33.2	372.4	1.7	1.8	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.0	31.2	11.2	0.5	0.0	0.0	79.8
10	19.6	52.9	886.8	0.6	0.6	165.5	27.4	0.3	828.5	163.4	83.2	5.8	0.1	0.0	1136.0	0.0	179.7	68.6	95.5	14.6	32.3	32.3	2834.5
11	17.3	44.4	107.7	0.8	0.9	47.0	7.8	0.2	235.2	46.4	23.6	1.6	0.0	0.0	324.1	0.0	73.0	42.2	29.3	4.4	9.2	9.2	855.1
12	15.5	43.0	122.3	0.9	0.9	19.9	3.3	0.3	99.8	19.7	10.0	0.7	0.0	0.0	138.9	0.0	49.4	45.3	17.2	2.1	3.9	3.9	416.3
13	17.4	37.0	72.0	1.1	1.2	43.9	7.3	0.2	219.6	43.3	22.0	1.5	0.0	0.0	302.9	0.0	67.5	42.4	39.8	4.1	8.6	8.6	814.0
14	14.5	44.0	38.4	0.9	1.0	14.6	2.5	0.3	79.8	15.7	8.0	0.5	0.0	0.0	106.4	0.0	43.0	41.9	15.1	1.6	2.8	2.8	337.0
15	15.8	49.6	36.4	1.0	1.0	17.5	2.9	0.2	87.7	17.3	8.8	0.6	0.0	0.0	121.7	0.0	44.8	44.8	16.1	2.0	3.4	3.4	373.5
16	14.9	50.7	23.1	1.8	1.9	11.8	2.1	0.2	64.8	12.8	6.5	0.4	0.0	0.0	86.5	0.0	39.9	42.6	13.0	1.5	2.3	2.3	290.4
17	11.9	59.4	69.7	1.1	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	29.7	38.5	6.1	0.6	0.0	0.0	78.2
18	9.1	68.9	101.2	1.2	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	25.0	39.4	5.1	0.2	1.0	0.0	74.5
19	5.2	40.9	230.1	0.9	1.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	14.9	4.0	0.0	0.0	0.0	21.5
20	4.0	8.0	72.9	0.8	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	12.0	0.0	0.0	0.0	14.4
21	2.9	37.2	79.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	6.3	12.2	0.0	0.0	0.0	20.7
22	3.0	35.3	42.6	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	5.5	3.2	0.0	0.0	0.0	10.7
23	3.8	111.6	232.5	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.5	2.3	0.0	0.1	0.0	12.9
24	3.2	9.3	127.5	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.2	0.0	0.0	0.0	2.6
Average			168.3	0.9	0.9	13.3	2.2	0.1	67.3	13.3	6.8	0.5	0.0	13.7	92.9	0.3	26.1	22.0	12.4	1.3	4.1	2.6	280.7
Percentage Contribution				0.3%	0.3%	4.8%	0.8%	0.1%	24.0%	4.7%	2.4%	0.2%	0.0%	4.9%	33.1%	0.1%	9.3%	7.8%	4.4%	0.5%	1.4%	0.9%	100%

Table BX-14: 4/27/2018 Cowtown (CWT) High-wind Day Projected Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	Desert Shrubland		Developed Rural Lands	Developed Urban Lands	Other	CAFOs	Agriculture		Unpaved Road						Total
									County	Tribal					County	Tribal	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	Test Tracks	
1	6.0	332.4	68.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.7	320.5	73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	5.8	314.7	88.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	3.8	84.4	59.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	2.1	25.7	92.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	2.4	156.6	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1.6	229.1	326.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	2.1	11.6	222.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	10.7	33.2	372.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	19.6	52.9	886.8	0.0	0.0	165.5	27.4	0.0	828.5	163.4	83.2	5.8	0.1	0.0	1,134.5	0.0	151.2	28.0	87.9	14.0	0.0	32.3	2,721.9
11	17.3	44.4	107.7	0.0	0.0	47.0	7.8	0.0	235.2	46.4	23.6	1.6	0.0	0.0	322.1	0.0	42.9	8.0	25.0	4.0	0.0	9.2	772.9
12	15.5	43.0	122.3	0.0	0.0	19.9	3.3	0.0	99.8	19.7	10.0	0.7	0.0	0.0	136.7	0.0	18.2	3.4	10.6	1.7	0.0	3.9	328.0
13	17.4	37.0	72.0	0.0	0.0	43.9	7.3	0.0	219.6	43.3	22.0	1.5	0.0	0.0	300.7	0.0	40.1	7.4	23.3	3.7	0.0	8.6	721.4
14	14.5	44.0	38.4	0.0	0.0	14.6	2.5	0.0	79.8	15.7	8.0	0.5	0.0	0.0	104.5	0.0	12.9	2.4	7.5	1.2	0.0	2.8	252.5
15	15.8	49.6	36.4	0.0	0.0	17.5	2.9	0.0	87.7	17.3	8.8	0.6	0.0	0.0	120.1	0.0	16.0	3.0	9.3	1.5	0.0	3.4	288.2
16	14.9	50.7	23.1	0.0	0.0	11.8	2.1	0.0	64.8	12.8	6.5	0.4	0.0	0.0	84.9	0.0	10.5	2.0	6.1	1.0	0.0	2.3	205.1
17	11.9	59.4	69.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	9.1	68.9	101.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	5.2	40.9	230.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	4.0	8.0	72.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	2.9	37.2	79.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	3.0	35.3	42.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	3.8	111.6	232.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	3.2	9.3	127.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			168.3	0.0	0.0	13.3	2.2	0.0	67.3	13.3	6.8	0.5	0.0	0.0	91.8	0.0	12.2	2.3	7.1	1.1	0.0	2.6	220.4
Percentage Contribution				0.0%	0.0%	6.1%	1.0%	0.0%	30.5%	6.0%	3.1%	0.2%	0.0%	0.0%	41.7%	0.0%	5.5%	1.0%	3.2%	0.5%	0.0%	1.2%	100%

Table BX-15: 4/27/2018 Cowtown (CWT) High-wind Day Projected Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	Desert Shrubland		Developed Rural Lands	Developed Urban Lands	Other	CAFOs	Agriculture		Unpaved Road						Total
									County	Tribal					County	Tribal	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	Test Tracks	
1	6.0	332.4	68.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	1.0
2	0.7	320.5	73.0	1.0	1.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	3.2
3	5.8	314.7	88.1	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0	2.6
4	3.8	84.4	59.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.5
5	2.1	25.7	92.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0	2.7
6	2.4	156.6	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	21.8	0.0	0.0	8.2	0.0	30.7
7	1.6	229.1	326.4	0.3	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	329.6	1.9	6.3	11.4	35.1	0.0	0.0	25.6	0.0	410.6
8	2.1	11.6	222.0	1.4	1.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	33.0	0.2	10.2	0.2	0.0	0.0	49.0
9	10.7	33.2	372.4	1.7	1.8	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.0	31.2	11.2	0.5	0.0	0.0	79.8
10	19.6	52.9	886.8	0.6	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	28.5	40.6	7.6	0.6	0.0	0.0	80.3
11	17.3	44.4	107.7	0.8	0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	30.1	34.3	4.3	0.4	0.0	0.0	73.0
12	15.5	43.0	122.3	0.9	0.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.2	41.9	6.6	0.4	0.0	0.0	84.4
13	17.4	37.0	72.0	1.1	1.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	27.4	35.0	16.5	0.4	0.0	0.0	84.1
14	14.5	44.0	38.4	0.9	1.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	30.1	39.5	7.6	0.4	0.0	0.0	81.8
15	15.8	49.6	36.4	1.0	1.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	28.8	41.9	6.8	0.5	0.0	0.0	81.8
16	14.9	50.7	23.1	1.8	1.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	29.4	40.6	6.9	0.5	0.0	0.0	83.0
17	11.9	59.4	69.7	1.1	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	29.7	38.5	6.1	0.6	0.0	0.0	78.2
18	9.1	68.9	101.2	1.2	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	25.0	39.4	5.1	0.2	1.0	0.0	74.5
19	5.2	40.9	230.1	0.9	1.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	14.9	4.0	0.0	0.0	0.0	21.5
20	4.0	8.0	72.9	0.8	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	12.0	0.0	0.0	0.0	14.4
21	2.9	37.2	79.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	6.3	12.2	0.0	0.0	0.0	20.7
22	3.0	35.3	42.6	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	5.5	3.2	0.0	0.0	0.0	10.7
23	3.8	111.6	232.5	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.5	2.3	0.0	0.1	0.0	12.9
24	3.2	9.3	127.5	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.2	0.0	0.0	0.0	2.6
Average			168.3	0.9	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	13.7	1.1	0.3	14.0	19.7	5.3	0.2	1.5	0.0	57.7
Percentage Contribution				1.5%	1.6%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	23.8%	1.8%	0.5%	24.2%	34.2%	9.2%	0.3%	2.5%	0.0%	100%

Table BX-16: 10/27/2018 Maricopa (MC) High-wind Day Projected Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	WSPD mph (H=10m)	WD	2008 PM10 Observation (µg/m3)	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	Agriculture		Unpaved Road					Total
													County	Tribal Land	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	
1	4.5	160.0	239.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	1.3
2	2.4	106.0	143.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	1.3
3	1.6	6.0	70.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.7
4	1.6	348.0	73.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
5	2.9	290.0	98.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.3
6	2.4	241.0	91.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.5
7	1.6	215.0	129.8	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	22.7	27.1
8	6.9	82.0	160.4	5.6	77.1	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	11.0	3.4	1.4	0.0	0.0	101.3
9	16.0	84.0	326.2	5.5	229.8	0.0	57.0	1.9	32.7	24.0	25.8	3.2	72.6	0.0	17.9	4.1	7.0	0.3	0.0	482.0
10	20.7	85.0	852.9	5.5	1102.1	0.0	345.9	2.2	190.6	139.7	168.2	18.8	428.8	0.0	57.8	11.2	36.9	2.0	0.0	2509.8
11	23.6	81.0	496.5	5.2	1025.5	0.0	319.1	2.1	175.9	128.9	155.2	17.4	395.7	0.0	54.8	10.1	33.0	1.8	0.0	2324.7
12	21.0	82.0	293.2	5.6	592.3	0.0	173.3	2.3	95.5	70.0	84.3	9.4	215.3	0.0	34.8	7.6	20.3	1.0	0.0	1311.8
13	21.9	79.0	176.0	6.1	433.3	0.0	120.0	2.1	66.1	48.4	58.4	6.5	149.3	0.0	27.6	5.9	14.0	0.7	0.0	938.5
14	21.6	74.0	141.9	5.6	381.9	0.0	93.3	2.2	51.4	37.7	45.4	5.1	116.3	0.1	22.2	4.3	10.5	0.5	0.0	776.6
15	19.9	72.0	84.8	5.7	236.3	0.0	45.5	1.9	26.1	19.2	20.6	2.5	58.2	0.1	14.9	0.9	5.3	0.2	0.0	437.5
16	17.6	71.0	76.6	5.5	177.0	0.0	24.6	1.9	14.1	10.4	11.2	1.4	31.9	0.1	11.9	0.5	3.4	0.1	0.0	294.0
17	16.0	72.0	68.6	6.5	134.1	0.0	9.5	1.8	5.5	4.0	4.3	0.5	12.8	0.1	10.3	0.2	1.7	0.1	0.0	191.4
18	10.8	62.0	60.4	4.6	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.6	0.3	6.5	0.0	0.9	0.0	1.7	16.3
19	8.8	61.0	56.2	5.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.4	6.8
20	9.1	68.0	45.1	3.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.2	4.5
21	11.9	70.0	36.1	3.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	3.9
22	12.2	80.0	30.8	3.4	4.9	0.0	1.8	0.1	1.1	0.8	0.8	0.1	2.3	0.0	0.2	0.5	0.7	0.0	0.0	16.8
23	11.3	82.0	33.2	2.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	3.2
24	11.1	78.0	38.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	1.8
Average			159.4	3.6	183.1	0.0	49.6	1.0	27.5	20.1	23.9	2.7	61.9	0.1	11.2	2.1	5.8	0.3	1.1	394.0
Percentage Contribution				0.9%	46.5%	0.0%	12.6%	0.2%	7.0%	5.1%	6.1%	0.7%	15.7%	0.0%	2.9%	0.5%	1.5%	0.1%	0.3%	100%

Table BX-17: 10/27/2018 Maricopa (MC) High-wind Day Projected Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	2008 PM10 Observation	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	Agriculture		Unpaved Road					Total
													County	Tribal Land	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	
1	4.5	160.0	239.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2.4	106.0	143.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1.6	6.0	70.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1.6	348.0	73.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	2.9	290.0	98.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	2.4	241.0	91.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1.6	215.0	129.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	6.9	82.0	160.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	16.0	84.0	326.2	0.0	161.6	0.0	57.0	0.0	32.7	24.0	25.8	3.2	71.9	0.0	7.3	1.2	5.1	0.3	0.0	390.1
10	20.7	85.0	852.9	0.0	1028.2	0.0	345.9	0.0	190.6	139.7	168.2	18.8	428.0	0.0	47.4	7.5	33.2	2.0	0.0	2,409.5
11	23.6	81.0	496.5	0.0	948.7	0.0	319.1	0.0	175.9	128.9	155.2	17.4	394.9	0.0	43.8	6.9	30.6	1.8	0.0	2,223.1
12	21.0	82.0	293.2	0.0	515.2	0.0	173.3	0.0	95.5	70.0	84.3	9.4	214.5	0.0	23.8	3.7	16.6	1.0	0.0	1,207.3
13	21.9	79.0	176.0	0.0	356.7	0.0	120.0	0.0	66.1	48.4	58.4	6.5	148.5	0.0	16.5	2.6	11.5	0.7	0.0	835.9
14	21.6	74.0	141.9	0.0	277.4	0.0	93.3	0.0	51.4	37.7	45.4	5.1	115.5	0.0	12.8	2.0	8.9	0.5	0.0	650.0
15	19.9	72.0	84.8	0.0	129.1	0.0	45.5	0.0	26.1	19.2	20.6	2.5	57.4	0.0	5.8	0.9	4.1	0.2	0.0	311.5
16	17.6	71.0	76.6	0.0	69.8	0.0	24.6	0.0	14.1	10.4	11.2	1.4	31.0	0.0	3.1	0.5	2.2	0.1	0.0	168.5
17	16.0	72.0	68.6	0.0	26.9	0.0	9.5	0.0	5.5	4.0	4.3	0.5	12.0	0.0	1.2	0.2	0.8	0.1	0.0	65.0
18	10.8	62.0	60.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	8.8	61.0	56.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	9.1	68.0	45.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	11.9	70.0	36.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	12.2	80.0	30.8	0.0	4.9	0.0	1.8	0.0	1.1	0.8	0.8	0.1	2.3	0.0	0.2	0.0	0.2	0.0	0.0	12.3
23	11.3	82.0	33.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	11.1	78.0	38.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			159.4	0.0	146.6	0.0	49.6	0.0	27.5	20.1	23.9	2.7	61.5	0.0	6.7	1.1	4.7	0.3	0.0	344.7
Percentage Contribution				0.0%	37.2%	0.0%	12.6%	0.0%	7.0%	5.1%	6.1%	0.7%	15.6%	0.0%	1.7%	0.3%	1.2%	0.1%	0.0%	87.5%

Table BX-18: 10/27/2018 Maricopa (MC) High-wind Day Projected Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	2008 PM10 Observation	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	Agriculture		Unpaved Road					Total
													County	Tribal Land	AG Road	Public Dirt	Private Dirt	Trail	Tribal Road	
1	4.5	160.0	239.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	1.3
2	2.4	106.0	143.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	1.3
3	1.6	6.0	70.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.7
4	1.6	348.0	73.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
5	2.9	290.0	98.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.3
6	2.4	241.0	91.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.5
7	1.6	215.0	129.8	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	22.7	27.1
8	6.9	82.0	160.4	5.6	77.1	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	11.0	3.4	1.4	0.0	0.0	101.3
9	16.0	84.0	326.2	5.5	68.2	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	10.6	2.9	1.9	0.0	0.0	91.9
10	20.7	85.0	852.9	5.5	73.9	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.8	0.0	10.4	3.7	3.7	0.0	0.0	100.3
11	23.6	81.0	496.5	5.2	76.8	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.8	0.0	11.0	3.2	2.4	0.0	0.0	101.6
12	21.0	82.0	293.2	5.6	77.1	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.8	0.0	11.0	3.9	3.7	0.0	0.0	104.5
13	21.9	79.0	176.0	6.1	76.6	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.8	0.0	11.1	3.3	2.5	0.0	0.0	102.6
14	21.6	74.0	141.9	5.6	104.5	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.8	0.1	9.4	2.3	1.6	0.0	0.0	126.6
15	19.9	72.0	84.8	5.7	107.2	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.1	9.1	0.0	1.2	0.0	0.0	126.0
16	17.6	71.0	76.6	5.5	107.2	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.1	8.8	0.0	1.2	0.0	0.0	125.5
17	16.0	72.0	68.6	6.5	107.2	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.8	0.1	9.1	0.0	0.9	0.0	0.0	126.4
18	10.8	62.0	60.4	4.6	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.6	0.3	6.5	0.0	0.9	0.0	1.7	16.3
19	8.8	61.0	56.2	5.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.4	6.8
20	9.1	68.0	45.1	3.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.2	4.5
21	11.9	70.0	36.1	3.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	3.9
22	12.2	80.0	30.8	3.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	4.5
23	11.3	82.0	33.2	2.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	3.2
24	11.1	78.0	38.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	1.8
Average			159.4	3.6	36.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.4	0.1	4.5	1.0	1.1	0.0	1.1	49.3
Percentage Contribution				7.3%	74.0%	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.2%	9.1%	2.1%	2.2%	0.0%	2.3%	100%

Table BX-19: 1/1/2018 Pinal County Housing (PCH) High-wind Day Projected Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	WSPD mph (H=10m)	WD	PM10 Observation	Paved Road	Permitted Point Sources	Construction	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	0.0	1.4
2	1.5	318.0	21.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.7	0.0	4.2
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	0.0	2.9
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.7
5	5.9	352.2	16.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.4	0.0	3.2
6	3.1	299.6	19.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	5.7	3.1	0.0	9.0
7	3.9	339.3	16.2	0.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	12.7	46.4	15.3	11.9	0.9	89.1
8	5.7	5.0	22.7	1.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	14.0	61.6	11.9	6.1	0.1	96.4
9	4.8	53.9	34.7	0.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	15.2	61.2	20.1	11.5	0.4	109.5
10	16.2	41.2	871.2	0.7	0.0	1.5	0.7	16.2	60.2	29.1	2.5	473.0	97.2	28.0	34.8	6.3	750.3
11	21.3	46.3	919.3	0.8	0.0	0.0	0.5	67.0	238.9	115.6	11.0	2050.2	231.4	39.6	59.9	26.5	2841.4
12	24.9	49.6	1,136.1	0.5	0.0	0.0	0.6	221.0	787.7	381.0	36.2	6735.9	621.4	91.8	166.8	86.5	9129.3
13	23.4	48.5	790.7	0.5	0.0	0.0	0.5	91.3	325.4	157.4	15.0	2790.1	291.4	48.9	77.5	36.0	3834.0
14	22.8	48.3	946.1	0.5	0.0	0.0	0.6	48.5	172.8	83.6	8.0	1487.7	183.2	37.8	61.0	19.3	2103.0
15	19.1	47.6	320.0	0.5	0.0	0.0	0.5	23.7	87.9	42.5	3.6	686.7	115.5	32.5	37.9	9.0	1040.4
16	22.1	53.6	397.9	0.8	0.0	0.0	0.5	45.3	161.7	78.2	7.4	1394.7	177.0	42.9	50.8	18.1	1977.4
17	19.8	53.6	281.9	0.9	0.0	0.0	0.5	26.4	98.0	47.4	4.0	768.6	124.0	36.3	31.5	10.0	1147.6
18	15.0	50.6	65.8	0.8	0.0	0.0	0.6	7.3	28.1	13.6	1.0	207.5	76.7	27.0	18.4	2.7	383.7
19	15.5	54.6	50.9	0.8	0.0	0.0	0.1	4.1	15.2	7.3	0.6	116.6	9.7	15.6	16.2	1.5	187.7
20	19.2	58.1	61.5	0.6	0.0	0.0	0.1	10.0	37.2	18.0	1.5	285.8	23.8	11.9	16.4	3.6	408.9
21	19.2	56.7	70.6	0.4	0.0	0.0	0.1	9.1	33.8	16.4	1.4	259.8	21.7	12.3	17.4	3.3	375.7
22	19.0	57.4	67.6	0.4	0.0	0.0	0.0	7.3	27.0	13.1	1.1	207.8	17.3	10.2	7.6	2.6	294.5
23	17.1	55.7	32.7	0.2	0.0	0.0	0.0	3.5	12.8	6.2	0.5	98.7	8.2	6.1	5.0	1.3	142.7
24	14.8	54.6	139.3	0.1	0.0	0.0	0.0	3.4	13.0	6.3	0.5	89.3	7.4	4.1	2.9	1.1	128.1
Average			264.9	0.5	0.0	0.1	0.4	24.3	87.5	42.3	3.9	737.3	90.6	21.1	26.7	9.5	1044.3
Percentage Contribution				0.0%	0.0%	0.0%	0.0%	2.3%	8.4%	4.1%	0.4%	70.6%	8.7%	2.0%	2.6%	0.9%	100%

Table BX-20: 1/1/2018 Pinal County Housing (PCH) High-wind Day Projected Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Permitted Point Sources	Construction	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1.5	318.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	5.9	352.2	16.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.1	299.6	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	3.9	339.3	16.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	5.7	5.0	22.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	4.8	53.9	34.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	16.2	41.2	871.2	0.0	0.0	0.0	0.0	16.2	60.2	29.1	2.5	462.8	38.6	4.8	9.7	5.9	629.9
11	21.3	46.3	919.3	0.0	0.0	0.0	0.0	67.0	238.9	115.6	11.0	2,039.0	171.1	21.2	43.2	26.1	2,733.2
12	24.9	49.6	1,136.1	0.0	0.0	0.0	0.0	221.0	787.7	381.0	36.2	6,722.1	564.1	70.0	142.4	86.1	9,010.6
13	23.4	48.5	790.7	0.0	0.0	0.0	0.0	91.3	325.4	157.4	15.0	2,777.0	233.1	28.9	58.8	35.6	3,722.5
14	22.8	48.3	946.1	0.0	0.0	0.0	0.0	48.5	172.8	83.6	8.0	1,474.7	123.8	15.4	31.2	18.9	1,976.8
15	19.1	47.6	320.0	0.0	0.0	0.0	0.0	23.7	87.9	42.5	3.6	675.5	56.3	7.0	14.2	8.6	919.3
16	22.1	53.6	397.9	0.0	0.0	0.0	0.0	45.3	161.7	78.2	7.4	1,379.6	115.8	14.4	29.2	17.7	1,849.3
17	19.8	53.6	281.9	0.0	0.0	0.0	0.0	26.4	98.0	47.4	4.0	753.5	62.8	7.9	15.8	9.6	1,025.4
18	15.0	50.6	65.8	0.0	0.0	0.0	0.0	7.3	28.1	13.6	1.0	193.5	16.0	2.0	4.0	2.4	267.9
19	15.5	54.6	50.9	0.0	0.0	0.0	0.0	4.1	15.2	7.3	0.6	116.6	9.7	1.2	2.5	1.5	158.7
20	19.2	58.1	61.5	0.0	0.0	0.0	0.0	10.0	37.2	18.0	1.5	285.8	23.8	3.0	6.0	3.6	388.9
21	19.2	56.7	70.6	0.0	0.0	0.0	0.0	9.1	33.8	16.4	1.4	259.8	21.7	2.7	5.5	3.3	353.7
22	19.0	57.4	67.6	0.0	0.0	0.0	0.0	7.3	27.0	13.1	1.1	207.8	17.3	2.2	4.4	2.6	282.9
23	17.1	55.7	32.7	0.0	0.0	0.0	0.0	3.5	12.8	6.2	0.5	98.7	8.2	1.0	2.1	1.3	134.4
24	14.8	54.6	139.3	0.0	0.0	0.0	0.0	3.4	13.0	6.3	0.5	89.3	7.4	0.9	1.9	1.1	123.7
Average			264.9	0.0	0.0	0.0	0.0	24.3	87.5	42.3	3.9	730.7	61.2	7.6	15.5	9.3	982.4
Percentage Contribution				0.0%	0.0%	0.0%	0.0%	2.5%	8.9%	4.3%	0.4%	74.4%	6.2%	0.8%	1.6%	1.0%	100%

Table BX-21: 1/1/2018 Pinal County Housing (PCH) High-wind Day Projected Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Permitted Point Sources	Construction	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	0.0	1.4
2	1.5	318.0	21.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.7	0.0	4.2
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	0.0	2.9
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.7
5	5.9	352.2	16.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.4	0.0	3.2
6	3.1	299.6	19.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	5.7	3.1	0.0	9.0
7	3.9	339.3	16.2	0.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	12.7	46.4	15.3	11.9	0.9	89.1
8	5.7	5.0	22.7	1.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	14.0	61.6	11.9	6.1	0.1	96.4
9	4.8	53.9	34.7	0.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	15.2	61.2	20.1	11.5	0.4	109.5
10	16.2	41.2	871.2	0.7	0.0	1.5	0.7	0.0	0.0	0.0	0.0	10.2	58.6	23.2	25.1	0.4	120.4
11	21.3	46.3	919.3	0.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	11.1	60.3	18.4	16.7	0.4	108.3
12	24.9	49.6	1,136.1	0.5	0.0	0.0	0.6	0.0	0.0	0.0	0.0	13.8	57.3	21.8	24.4	0.4	118.8
13	23.4	48.5	790.7	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	13.0	58.3	20.0	18.7	0.4	111.5
14	22.8	48.3	946.1	0.5	0.0	0.0	0.6	0.0	0.0	0.0	0.0	13.0	59.4	22.4	29.8	0.4	126.2
15	19.1	47.6	320.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	11.1	59.2	25.5	23.7	0.4	121.1
16	22.1	53.6	397.9	0.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	15.2	61.2	28.5	21.6	0.4	128.1
17	19.8	53.6	281.9	0.9	0.0	0.0	0.5	0.0	0.0	0.0	0.0	15.2	61.2	28.4	15.7	0.4	122.2
18	15.0	50.6	65.8	0.8	0.0	0.0	0.6	0.0	0.0	0.0	0.0	13.9	60.7	25.0	14.4	0.3	115.8
19	15.5	54.6	50.9	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	14.4	13.7	0.0	29.0
20	19.2	58.1	61.5	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	8.9	10.4	0.0	20.0
21	19.2	56.7	70.6	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	9.6	11.9	0.0	22.1
22	19.0	57.4	67.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	3.2	0.0	11.6
23	17.1	55.7	32.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	2.9	0.0	8.3
24	14.8	54.6	139.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	1.0	0.0	4.4
Average			264.9	0.5	0.0	0.1	0.4	0.0	0.0	0.0	0.0	6.6	29.4	13.5	11.3	0.2	61.9
Percentage Contribution				0.8%	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	10.7%	47.5%	21.8%	18.2%	0.3%	100%

Table BX-22: 11/21/2018 Stanfield (STF) High-wind Day Projected Source Apportionment (Total) Monitor Impacts (lbs/mile)

Hour	WSPD mph (H=10m)	WD (degree)	2008 PM10 Observations (µg/m3)	Paved Road	Construction	CAFOs	Dairies	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	3.5	119.2	112.4	0.1	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.6	0.0	6.6
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	0.0	2.4
3	3.4	117.3	157.4	0.0	0.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.0	12.1
4	3.7	125.4	158.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.3
5	3.2	274.2	102.3	0.2	0.0	31.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	33.9
6	3.4	240.9	234.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.6	0.0	5.8
7	13.2	85.5	357.4	1.1	0.0	66.2	4.4	0.4	8.2	60.1	12.3	239.2	58.9	27.9	11.7	7.0	497.4
8	14.7	81.9	326.6	1.8	0.6	68.6	5.0	0.4	9.3	68.2	13.9	270.6	63.4	38.0	10.5	8.0	558.3
9	16.3	82.2	584.6	1.6	0.6	125.7	18.8	0.4	33.2	233.3	47.7	987.2	107.6	42.0	32.2	25.8	1656.1
10	16.0	81.1	429.2	0.9	0.6	78.6	7.4	0.5	13.1	91.9	18.8	394.8	71.1	36.4	19.4	11.8	745.3
11	16.0	80.2	334.3	0.9	0.6	26.4	6.4	0.4	11.3	79.3	16.2	342.3	63.7	32.2	15.1	10.5	605.4
12	14.6	80.4	186.1	1.0	0.6	48.9	2.6	0.5	4.8	34.8	7.1	143.3	51.1	35.2	12.4	5.5	347.7
13	12.2	79.2	93.9	1.1	0.6	4.7	1.1	0.4	2.1	15.4	3.2	68.5	46.9	31.3	7.9	3.7	186.9
14	11.1	78.5	65.1	1.1	0.6	0.0	0.0	0.5	0.0	0.0	0.0	9.4	43.8	35.0	10.0	2.3	102.6
15	10.2	75.3	64.8	1.0	0.6	0.0	0.0	0.5	0.0	0.0	0.0	9.1	44.8	44.4	8.0	2.4	110.6
16	8.2	77.2	65.2	2.2	0.6	0.0	0.0	0.5	0.0	0.0	0.0	8.8	43.9	45.3	8.5	2.3	112.0
17	5.9	74.7	87.1	1.9	0.6	0.0	0.0	0.4	0.0	0.0	0.0	9.5	44.8	47.0	6.2	2.4	112.9
18	4.0	73.8	104.6	2.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	9.7	45.4	42.4	5.1	2.5	107.5
19	5.3	75.1	88.3	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	24.0	5.4	0.0	30.6
20	4.6	86.2	56.1	0.9	0.0	86.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1	4.1	0.0	104.5
21	2.3	158.4	98.3	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	8.7	0.9	0.0	10.2
22	1.9	230.2	249.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.1	0.0	4.1
23	2.5	270.1	171.6	0.9	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	10.8
24	2.1	291.4	99.5	0.1	0.0	9.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	10.3
Average			178.6	0.9	0.3	23.7	2.1	0.2	3.4	24.3	5.0	103.8	28.6	21.4	6.9	3.5	224.0
Percentage Contribution				0.4%	0.1%	10.6%	0.9%	0.1%	1.5%	10.8%	2.2%	46.4%	12.7%	9.5%	3.1%	1.6%	100%

Table BX-23: 11/21/2018 Stanfield (STF) High-wind Day Projected Source Apportionment (Windblown) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Dairies	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	3.5	119.2	112.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3.4	117.3	157.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	3.7	125.4	158.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	3.2	274.2	102.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	3.4	240.9	234.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	13.2	85.5	357.4	0.0	0.0	18.2	4.4	0.0	8.2	60.1	12.3	229.8	13.9	2.9	6.3	5.5	361.7
8	14.7	81.9	326.6	0.0	0.0	20.7	5.0	0.0	9.3	68.2	13.9	260.8	15.8	3.3	7.2	6.3	410.5
9	16.3	82.2	584.6	0.0	0.0	77.7	18.8	0.0	33.2	233.3	47.7	977.4	60.8	12.4	27.7	24.1	1513.3
10	16.0	81.1	429.2	0.0	0.0	30.6	7.4	0.0	13.1	91.9	18.8	385.0	24.0	4.9	10.9	9.5	596.1
11	16.0	80.2	334.3	0.0	0.0	26.4	6.4	0.0	11.3	79.3	16.2	332.3	20.7	4.2	9.4	8.2	514.5
12	14.6	80.4	186.1	0.0	0.0	10.6	2.6	0.0	4.8	34.8	7.1	133.3	8.1	1.7	3.7	3.2	209.8
13	12.2	79.2	93.9	0.0	0.0	4.7	1.1	0.0	2.1	15.4	3.2	59.1	3.6	0.7	1.6	1.4	93.0
14	11.1	78.5	65.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	10.2	75.3	64.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	8.2	77.2	65.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	5.9	74.7	87.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	4.0	73.8	104.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	5.3	75.1	88.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	4.6	86.2	56.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	2.3	158.4	98.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	1.9	230.2	249.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	2.5	270.1	171.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	2.1	291.4	99.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			178.6	0.0	0.0	7.9	1.9	0.0	3.4	24.3	5.0	99.1	6.1	1.3	2.8	2.4	154.1
Percentage Contribution				0.0%	0.0%	5.1%	1.2%	0.0%	2.2%	15.8%	3.2%	64.3%	4.0%	0.8%	1.8%	1.6%	100%

Table BX-24: 11/21/2018 Stanfield (STF) High-wind Day Projected Source Apportionment (Activity) Monitor Impacts (lbs/mile)

Hour	SPD mph (H=10m)	WD	PM10 Observation	Paved Road	Construction	CAFOs	Dairies	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Road				Total
													AG Road	Public Dirt	Private Dirt	Trail	
1	3.5	119.2	112.4	0.1	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.6	0.0	6.6
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	0.0	2.4
3	3.4	117.3	157.4	0.0	0.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.0	12.1
4	3.7	125.4	158.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.3
5	3.2	274.2	102.3	0.2	0.0	31.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	33.9
6	3.4	240.9	234.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.6	0.0	5.8
7	13.2	85.5	357.4	1.1	0.0	47.9	0.0	0.4	0.0	0.0	0.0	9.3	45.0	25.0	5.4	1.5	135.7
8	14.7	81.9	326.6	1.8	0.6	47.9	0.0	0.4	0.0	0.0	0.0	9.8	47.6	34.7	3.3	1.7	147.8
9	16.3	82.2	584.6	1.6	0.6	47.9	0.0	0.4	0.0	0.0	0.0	9.8	46.7	29.6	4.5	1.7	142.8
10	16.0	81.1	429.2	0.9	0.6	47.9	0.0	0.5	0.0	0.0	0.0	9.8	47.1	31.5	8.5	2.3	149.2
11	16.0	80.2	334.3	0.9	0.6	0.0	0.0	0.4	0.0	0.0	0.0	9.9	43.0	28.0	5.7	2.3	90.9
12	14.6	80.4	186.1	1.0	0.6	38.3	0.0	0.5	0.0	0.0	0.0	9.9	43.0	33.5	8.7	2.3	137.9
13	12.2	79.2	93.9	1.1	0.6	0.0	0.0	0.4	0.0	0.0	0.0	9.4	43.3	30.5	6.3	2.3	93.9
14	11.1	78.5	65.1	1.1	0.6	0.0	0.0	0.5	0.0	0.0	0.0	9.4	43.8	35.0	10.0	2.3	102.6
15	10.2	75.3	64.8	1.0	0.6	0.0	0.0	0.5	0.0	0.0	0.0	9.1	44.8	44.4	8.0	2.4	110.6
16	8.2	77.2	65.2	2.2	0.6	0.0	0.0	0.5	0.0	0.0	0.0	8.8	43.9	45.3	8.5	2.3	112.0
17	5.9	74.7	87.1	1.9	0.6	0.0	0.0	0.4	0.0	0.0	0.0	9.5	44.8	47.0	6.2	2.4	112.9
18	4.0	73.8	104.6	2.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	9.7	45.4	42.4	5.1	2.5	107.5
19	5.3	75.1	88.3	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	24.0	5.4	0.0	30.6
20	4.6	86.2	56.1	0.9	0.0	86.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1	4.1	0.0	104.5
21	2.3	158.4	98.3	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	8.7	0.9	0.0	10.2
22	1.9	230.2	249.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.1	0.0	4.1
23	2.5	270.1	171.6	0.9	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	10.8
24	2.1	291.4	99.5	0.1	0.0	9.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	10.3
Average			178.6	0.9	0.3	15.8	0.1	0.2	0.0	0.0	0.0	4.8	22.4	20.1	4.1	1.1	69.9
Percentage Contribution				1.3%	0.4%	22.7%	0.2%	0.3%	0.0%	0.0%	0.0%	6.8%	32.1%	28.8%	5.8%	1.6%	100%

BXI. Pinal County Land Use Descriptions

Twelve Pinal County Land Use Descriptions

9/17/2013

The twelve land uses listed in the Table BXI-1 below include nine land uses which were previously agreed upon by the Arizona Department of Environmental Quality (ADEQ), Pinal County Air Quality Control District (PCAQCD), and Sierra Research as land use classifications for the purposes of calculating the Pinal County Nonattainment Area Emission Inventory, as well as three additional land uses for subclassification of construction areas which were derived from County construction permits. A GIS layer has been created categorizing areas of the Pinal County Nonattainment Area into the twelve land use categories listed below:

Table BXI-1: Identified Pinal County Land Uses

ADEQID	Description
A	Developed Urban Lands
B	Developed Rural Lands (low density residential)
C	Paved Roads
D	Unpaved Roads
E	Cleared Areas
F	Residential Construction
G	Dairies
G'	CAFOs
H	Desert Shrubland
I	Agricultural Croplands
J	Commercial Construction
K	Other
L	Site Development

Below are descriptions of each of the land uses listed in the above Table.

A. Developed Urban Lands – A land parcel which has been significantly cleared of natural desert vegetation, contains a man-made structure, and has a total area of land which is greater than ~50% covered by non-native vegetation (e.g. lawn grass), rock, buildings, or pavement.
B. Developed Rural Lands – A land parcel which has been significantly cleared of natural desert vegetation, contains a man-made structure, but has a total area of land which is less than ~50% covered by non-native vegetation (e.g. lawn grass), rock, buildings, or pavement.
C. Paved Roads – Any roadway which has been covered by concrete or asphalt pavement.

D. Unpaved Roads – Any roadway which has not been covered by concrete or asphalt pavement including County Maintained Dirt, Trail, Asphalt Rock Dust Pallative (ARDP), Private Dirt, Railroad, Agricultural, and Construction roadways.
E. Cleared Areas – A land parcel which has been significantly cleared of natural desert vegetation, but does not contain a man-made structure or significant coverage by non-native vegetation.
F. Residential Construction – A land parcel which was permitted for residential construction for the year of 2008 by PCAQCD or which contained visible evidence of residential construction from 2008 aerial photography (e.g. unfinished residential structures and construction equipment).
G. Dairies – A land parcel which was identified as a dairy by PCAQCD and verified by ADEQ.
G'. CAFOs – A land parcel which was identified as a Concentrated Animal Feeding Operation (CAFO) PCAQCD and verified by ADEQ.
H. Desert Shrublands – A land parcel which has no significant clearing of natural vegetation and contains no man-made structures.
I. Agricultural Croplands – A land parcel which was identified by PCAQD or ADEQ through aerial photography as actively growing or showing signs of previously growing cultivated crops for agricultural purposes. This land use was QA/QC'ed by the Cotton Research and Protection Council and further resolved to the crops grown on individual fields within a 6 km boundary of the Maricopa, Cowtown, Pinal County Housing, and Stanfield air monitors for the year of 2008. Outside of these 6 km boundaries, agricultural land was identified by PCAQCD land ownership records.
J. Commercial Construction - A land parcel which was permitted by PCAQCD for commercial construction for the year of 2008.
K. Other – Any land use not identified by the eleven other land uses characterized in this list.
L. Site Development - A land parcel which had been significantly cleared of natural desert vegetation and is undergoing grading, filling, cutting, or trenching for infrastructure.

ADEQ created detailed GIS land use maps for a 6 km boundary surrounding the Maricopa, Cowtown, Pinal County Housing, and Stanfield monitors utilizing aerial photography to identify the land use classifications listed above (paved and unpaved roads were not characterized by ADEQ since these were contained within a detailed GIS layer created by PCAQCD). This GIS layer was later merged with a land use map created by PCAQCD to supplement those areas outside of the 6 km map but within the nonattainment area. The reason for recreating the land use map within a 6 km boundary of the 4 previously mentioned monitors in place of using the PCAQCD land use map was to increase land use resolution for those areas near each of the 4 modeled monitors. Creation of the 6 km map depended on the previously created PCAQCD land use map as well as analysis of 2008 aerial photography. Agricultural land within 6 km boundaries of the modeling monitors was then reviewed by the Cotton Research and Protection Council and further resolved to specify the types of crops grown on each crop field for the year 2008. ADEQ then merged this map with PCAQCD's 2008 construction permit map and PCAQCD's roadway map for Pinal County.

BXII. Selection of Cowtown PM_{10} Stagnation Design Day

Selection of Cowtown PM_{10} Stagnation Design Day

In the initial analysis and selection of stagnation design days for the three Western Pinal County monitoring stations that recorded exceedances of the 24-hour PM_{10} national ambient air quality standard (NAAQS or standard) on such days in 2008, there was one day of the year observed on which all three stations exceeded the standard: October 29, 2008. This led the State Implementation Plan (SIP) advisory committee to conclude that the meteorological conditions on this day were collectively the most severe (i.e., lowest wind velocities, least transport of directly emitted pollutants) of all stagnation days in that year. Due to the closure of several significant emission sources near the Cowtown monitor between 2008 and 2011 and the continued recording of 24-hour PM_{10} exceedances at the monitor, the committee revisited this earlier decision in an effort to better understand source-meteorological relationships and use these understandings to construct an attainment strategy demonstrating a higher probability of success.

Based on 24-hour average and maximum hour screening statistics, the meteorological conditions recorded on the original design day—October 29, 2008—at the Cowtown monitor were determined to be reasonably representative of meteorological conditions monitored on the 139 stagnation days on which PM_{10} exceedances were recorded at the Cowtown monitor in 2008. In general, as summarized in an initial planning document, wind speeds on October 29, 2008, were low (i.e., less than 4 mph) and fluctuations in hourly PM_{10} levels did not correlate with wind speed.[15] This latter condition is important as a good correlation would suggest the presence and influence of windblown PM_{10} sources impacting the monitor, which the stagnation design day selection criteria were designed to avoid.

The more intensive analysis of the October 29, 2008 source-meteorological relationships at the Cowtown monitor began with an examination of the earlier published plots of hourly PM_{10} concentrations, wind speeds, wind directions, and mixing heights for this day.[1] These plots are presented in Figures BXII-1, BXII-2, and BXII-3. Hourly average wind speeds during the 0300, 1300, and 2300 hours of this day approached and slightly exceeded 4.0 mph, which is the upper-limit criterion used by the advisory committee to define meteorological stagnation conditions. Also of significance, the hourly PM_{10} concentrations between 00:00 and 05:00 hours fluctuated reasonably well with wind speeds. As a result, October 29, 2008, marginally complied with the stagnation design

[15] Pinal County PM Inventory Preparation Plan, prepared for the Arizona Department of Environmental Quality by Sierra Research, January 2013

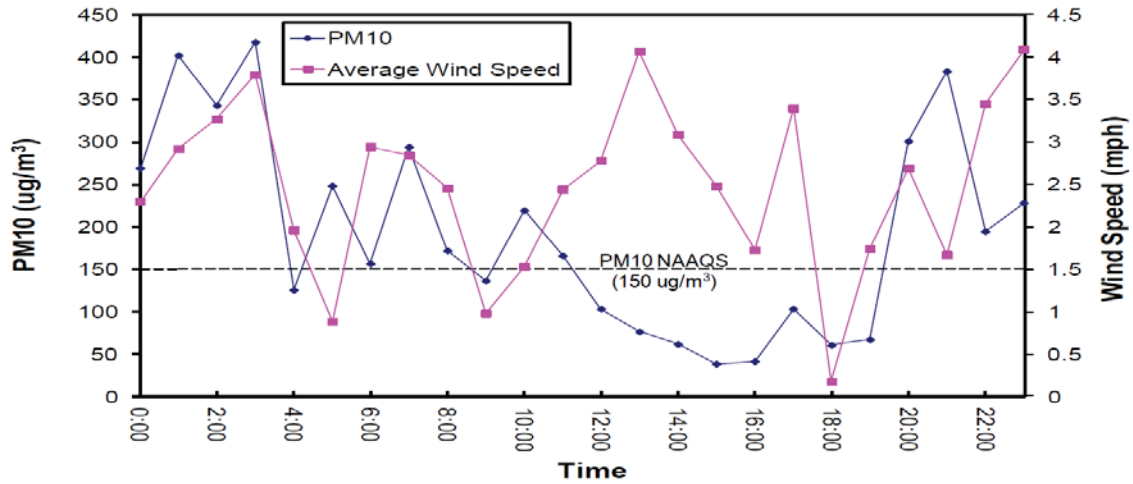

Figure BXII-1: Cowtown, 10/29/2008, Stagnation Day PM_{10} vs. Wind Speed

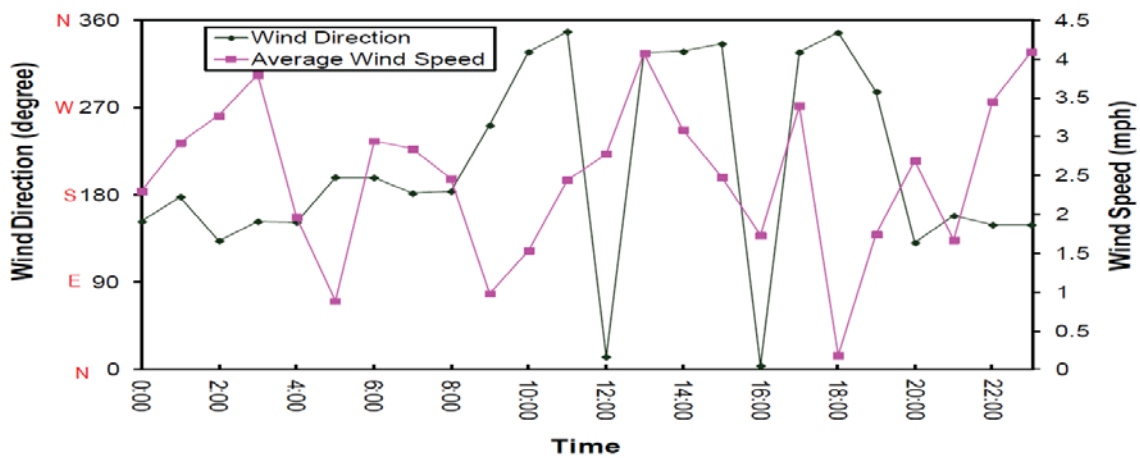

Figure BXII-2: Cowtown, 10/29/2008, Stagnation Day Wind Direction vs. Wind Speed

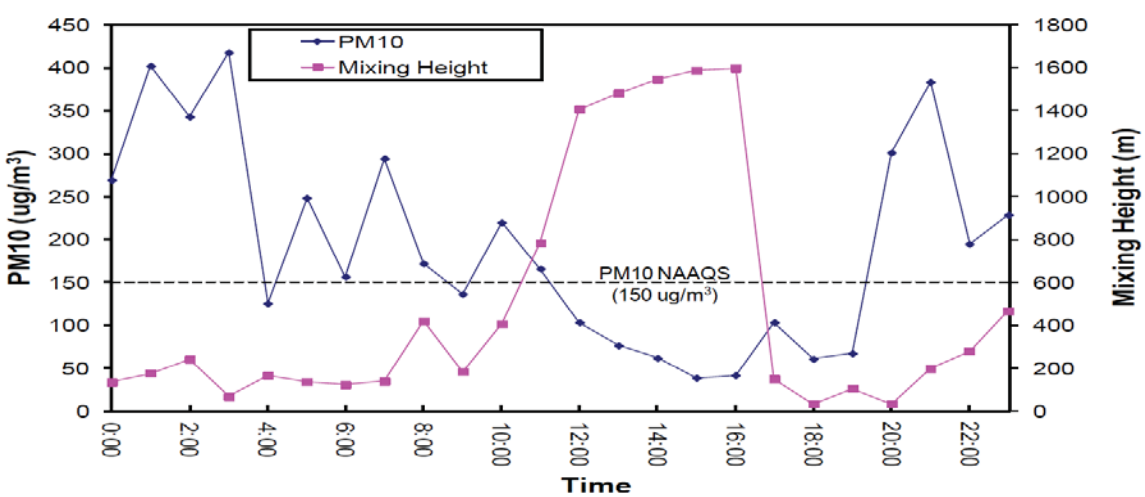

Figure BXII-3: Cowtown, 10/29/2008, Stagnation Day PM_{10} vs. Mixing Height

PM_{10} monitoring data collected in 2012 show that exceedances of the 24-hour standard on stagnation days remained frequent and at levels more than 50% of 2008 stagnation day readings. This finding demonstrated that October 29, 2008, was not a stagnation design day representative of typical fall exceedance day meteorological conditions or PM_{10} concentrations at the Cowtown monitor. As a result, the SIP advisory committee agreed that another stagnation exceedance day in 2008 should be considered for designation as the design day for the Cowtown monitoring site. The investigation and selection of an alternate stagnation exceedance day for the Cowtown site is summarized in the remainder of this analysis.

To better identify typical diurnal meteorological conditions and PM_{10} concentrations recorded on stagnation exceedance days in 2008 at the Cowtown monitor, these data were extracted from the 2008 data files and then plotted. Figures BXII-4, BXII-5, and BXII-6 present average wind speeds, wind directions, and PM_{10} concentrations—grouped by hour of the day—recorded on stagnation exceedance days at the Cowtown monitor.

As shown in Figure BXII-4, slightly lower average wind speeds, on an hour-of-the-day basis, occur on stagnation exceedance days in the fall than in the spring and summer seasons. (Values for winter months are not included in these plots as no stagnation exceedance days were recorded in the winter of 2008 at the Cowtown monitor.) This is not unusual as lighter wind speeds are typically found throughout the western United States during the fall months than in the two other seasons. The seasonal wind speed plots suggest that a fall stagnation exceedance day should be selected to represent all stagnation exceedance days because PM_{10} impacts will be higher in the fall, all other parameters being equal, than on a typical day in the other two seasons.

From an analysis of feedlot diurnal emission factors and interviews of feedlot representatives, Sierra found that feedlot hourly PM_{10} emissions peak between 1800 and 2100 hours in the fall as cattle become more active after feeding and as ambient temperatures begin to cool. Evidence of this increase can be seen for each of the three seasons shown in Figure BXII-6. The sharp increases in evening PM_{10} concentrations are also influenced by the dramatic lowering of the mixing height starting at sunset. To assure that the period of maximum hourly emissions were represented in the selection of a substitute stagnation design day at the Cowtown monitor, candidate fall days in 2008 were ranked on the basis of wind directions recorded between 1800 and 2000 hours. This ranking showed that during the fall season, between September 1 and November 30, 2008, 18 stagnation exceedance days recorded wind directions between 185 to 295 degrees on all three hours between 1800 and 2100 hours, the period of highest hourly concentrations.

The 18 candidate design days identified in the wind direction/hour-of-the-day screening analysis were further evaluated for PM_{10} impacts at the Cowtown monitor. The PM_{10} concentrations recorded at the monitor between 1800 and 2100 hours were averaged for each of the candidate days and then the days were ranked by this index; these values are shown in Table BXII-1. To select a substitute design day from this list, hourly PM_{10} and meteorological data for the five days recording the highest PM_{10} average during the 1800 to 2100 hours period were evaluated.

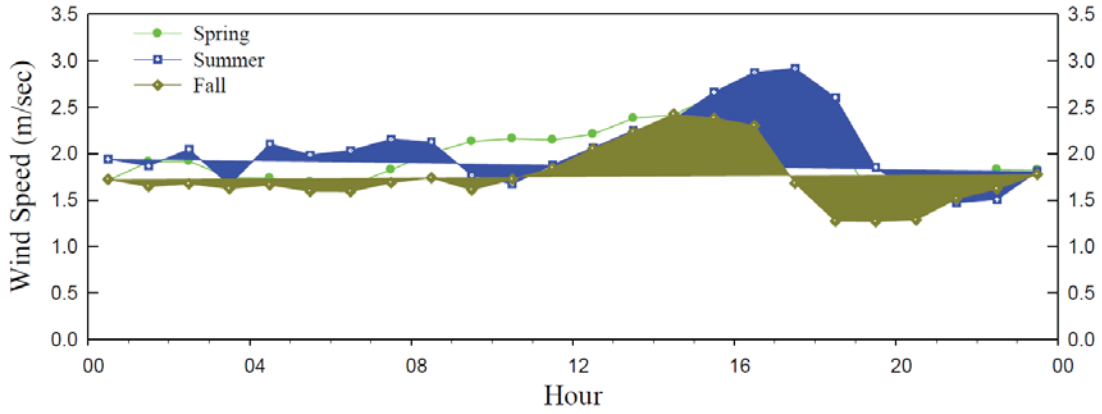

Figure BXII-4: Diurnal Variations of Wind Speed at Cowtown During Low Wind Violation Days in 2008

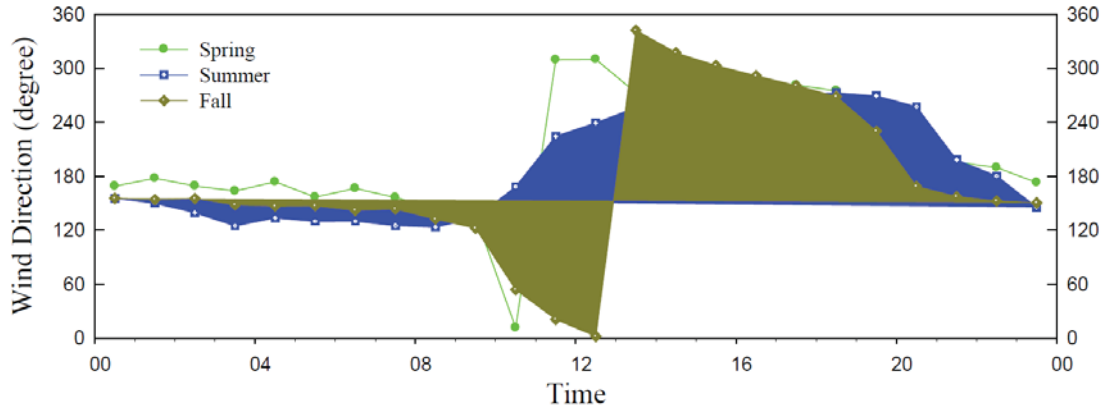

Figure BXII-5: Diurnal Variations of Wind Direction at Cowtown During Low Wind Violation Days in 2008

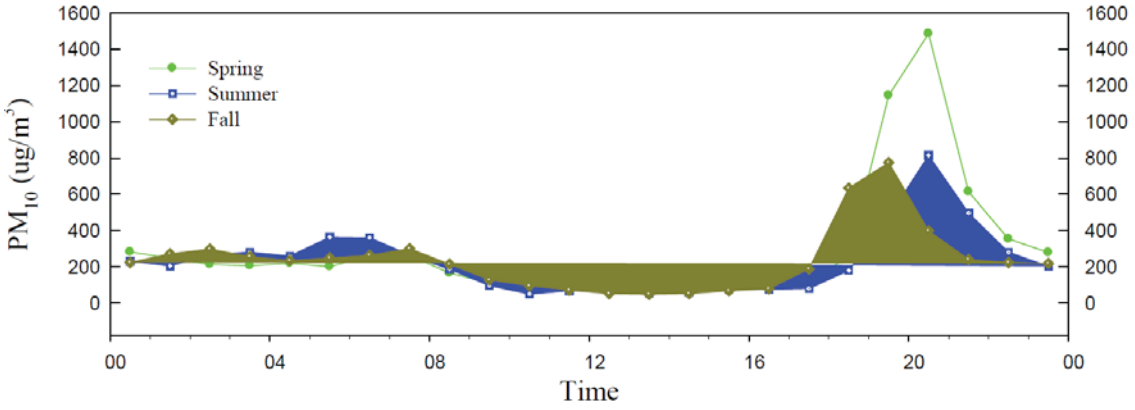

Figure BXII-6: Diurnal Variations of PM_{10} Concentrations at Cowtown During Low Wind Violation Days in 2008

A review of the five candidate design days found deficiencies in the data records of two of the days that suggested those days be dropped from consideration. During at least one hour of the day on September 17 and November 17, 2008, the Cowtown PM_{10} monitor recorded an hourly average concentration of 0.0 $\mu g/m^3$. The data record did not identify the reasons for these values, but the use of zero values in an attainment demonstration analysis was concluded to be too problematical and these days were eliminated from consideration.

Of the three remaining candidate days, one was found to have recorded wind speeds that were below the accepted threshold for anemometer accuracy at the Cowtown site. The accepted threshold (i.e., minimum acceptable wind speed) for this instrument is 0.5 m/sec. On November 12, 2008, at 2000 hours, a wind speed of 0.3 m/sec was recorded. Because this anomaly raised questions about the validity of meteorological during the period of highest concentrations, November 12, 2008 was dropped from consideration as a candidate day.

Table BXII-1: Statistics of the 18 PM10 Candidate Design Days

Date	Average of PM_{10} from Hour 18 to Hour 20	Daily PM_{10} average
11/8/2008	903	313
10/17/2008	899	345
11/12/2008	781	196
9/17/2008	673	230
10/30/2008	643	244
10/9/2008	605	205
11/1/2008	588	193
10/21/2008	550	256
10/3/2008	538	271
9/21/2008	468	174
9/18/2008	424	240
10/5/2008	396	189
11/11/2008	368	178
9/22/2008	354	263
11/3/2008	340	220
10/12/2008	296	188
9/14/2008	250	161
10/20/2008	225	224

Of the two remaining candidate days—October 30 and November 8, 2008—each reported complete sets of hourly PM_{10} and meteorological data and neither of the sets contained any questionable data. Analysis of the data recorded during the 1800-2100 hours period of each day showed that the average wind speed on October 30 was 0.70 m/sec; the corresponding average speed on November 8, 2008 was 1.33 m/sec. The lower wind speeds reported on October 30 suggest that meteorological conditions during the important period of highest feedlot emissions were more stagnant, resulting in relatively higher PM_{10} impacts at the Cowtown monitor per unit of emissions, than those conditions measured on November 8, 2008. As a result of this last comparison, October 30, 2008, was chosen as the 2008 stagnation PM_{10} design day for the Cowtown monitoring site.

BXIII. Cowtown Stagnation Design Day Modeling Domain Comparison: October 29, 2008 vs. October 30, 2008

Cowtown Stagnation Design Day Modeling Domain Comparison: October 29, 2008 vs. October 30, 2008

In light of the decision to replace the 10/29/08 Cowtown stagnation design day with 10/30/08 conditions, a separate analysis was prepared to assess the feasibility of using the modeling domain of the first design day to adequately represent the locations of significant sources impacting the monitoring site on the second design day.

The construction of a new modeling domain to serve as the areal framework for the modeling input file representing significant emission sources impacting the Cowtown monitoring station on October 30, 2008, was found to require a significant effort that conflicted with the tight schedule for completing this sensitivity test. As a result, a qualitative assessment of the source types, numbers, locations, and potential emission intensities that would be either added to the October 29, 2008 modeling domain or deducted from it was conducted to evaluate the significance of substituting the latter day modeling domain for that of the former. The steps followed in conducting this assessment are outlined below.

1. The hourly wind vectors representative of meteorological data recorded at the Cowtown monitoring site on October 30, 2008, were plotted in the same manner as was used to construct the modeling domain boundary for the October 29, 2008 design day analysis.

2. The rectangular boundary enclosing all of the October 30, 2008 hourly wind vectors, establishing the modeling domain representative of this day, were drawn.

3. Both the hourly wind vectors for each of the two design days and the resulting modeling domain boundaries were plotted on a Google Earth image centered over the Cowtown monitoring site.

4. Google Earth maps were carefully surveyed to qualitatively evaluate the types, numbers, locations, and potential emission densities of sources in the non-overlapping portions of the two domains.

5. The positive and negative contributions of emissions sources in non-overlapping areas being added to or deducted from the October 29, 2008 modeling domain to produce the October 30, 2008 modeling domain were qualitatively compared to estimate the significance of potential changes in emissions impacts at the monitor.

The plot of hourly wind vectors and resulting modeling domains for the two design days, as described earlier, is shown in Figure BXIII-1. The hourly wind vectors are shown as line segments converging at the location of the Cowtown monitor, and the modeling domains are shown as rectangles enclosing the daily sets of hourly wind vectors.

In Figure BXIII-1, the hourly wind vectors representing meteorological conditions recorded on October 29, 2008, are shown as green line segments converging at the location of the monitor. As discussed in greater detail in the PM_{10} modeling report supporting the Western Pinal County PM_{10} Nonattainment Plan, these separate wind vector line segments show the back-trajectories of air

parcels arriving at the monitoring station at the end of each clock hour of the design day. The distal ends of these lines show the farthest distances from the monitor of emission sources that could contribute to PM_{10} impacts recorded at the monitor. The rectangle colored purple in Figure BXIII-1, which just touches the farthest ends of wind vectors in the four major compass directions, encompasses the area beyond which emission sources are not physically capable of impacting the monitor on this design day.

The corresponding wind vector line segments and enclosing rectangle representative of meteorological conditions recorded on October 30, 2008, are shown in Figure BXIII-1 in yellow and blue, respectively. This latter-day modeling domain does not extend as far north, by about 0.5 miles, as the October 29 domain, but extends farther east and south—by 1.7 and 0.5 miles, respectively—than does the October 29 domain.

With respect to the northern non-overlapping area, none of the October 30 hourly back-trajectories extend into this zone, which means that the inclusion of this zone in an October 30th modeling input file would have no effect on modeled impacts at the Cowtown monitor as no emissions from sources in this zone would reach the monitor under October 30th meteorological conditions. Thus, the modeled impacts at the monitor on the October 30th design day from sources to the north of the monitor would be the same regardless of which modeling domain boundary was used.

With respect to the eastern non-overlapping area, the only land use designation ascribed to this zone in 2008 was desert shrubland. On stagnation design days, this desert shrubland produces almost no PM_{10} emissions with the exception of those generated by off-road vehicle travel. Close examination of the Google Earth images of this area from 2008 show very few vehicle tracks. Off-road vehicle use estimates reported by the NONROAD model confirm the observations that few, if any, PM_{10} emissions were produced by sources in this zone on stagnation days. Thus, the modeled impacts at the monitor on the October 30th design day from sources to the east of the monitor would be practically the same regardless of which modeling domain boundary were used.

With respect to the southern non-overlapping area, land uses in 2008 in this zone included primarily agricultural production, light-duty-vehicle performance testing, and rural residential occupancy. On October 30, 2008, only a single hourly back-trajectory extended into this zone. Within the non-overlapping zone, this back-trajectory crossed over 0.5 miles of land devoted primarily to the cultivation of alfalfa. Alfalfa cultivation produces relatively low PM_{10} emissions from mechanical activity due to the significant ground coverage provided by the crop and the relatively few equipment passes per year that are needed to sustain production of this crop. As a result, the modeled impacts at the monitor on the October 30th design day from sources to the south of the monitor would be practically the same regardless of which modeling domain boundary were used.

On the basis of findings made for each of the three non-overlapping areas that distinguish the modeling domains of October 29 and October 30, 2008, from each other, the PM_{10} impacts modeled at the Cowtown monitor will not vary beyond the level of 1 to 2 percent when using either of the October 29 or October 30, 2008 modeling domains as frameworks for the October 30, 2008 modeling input file.

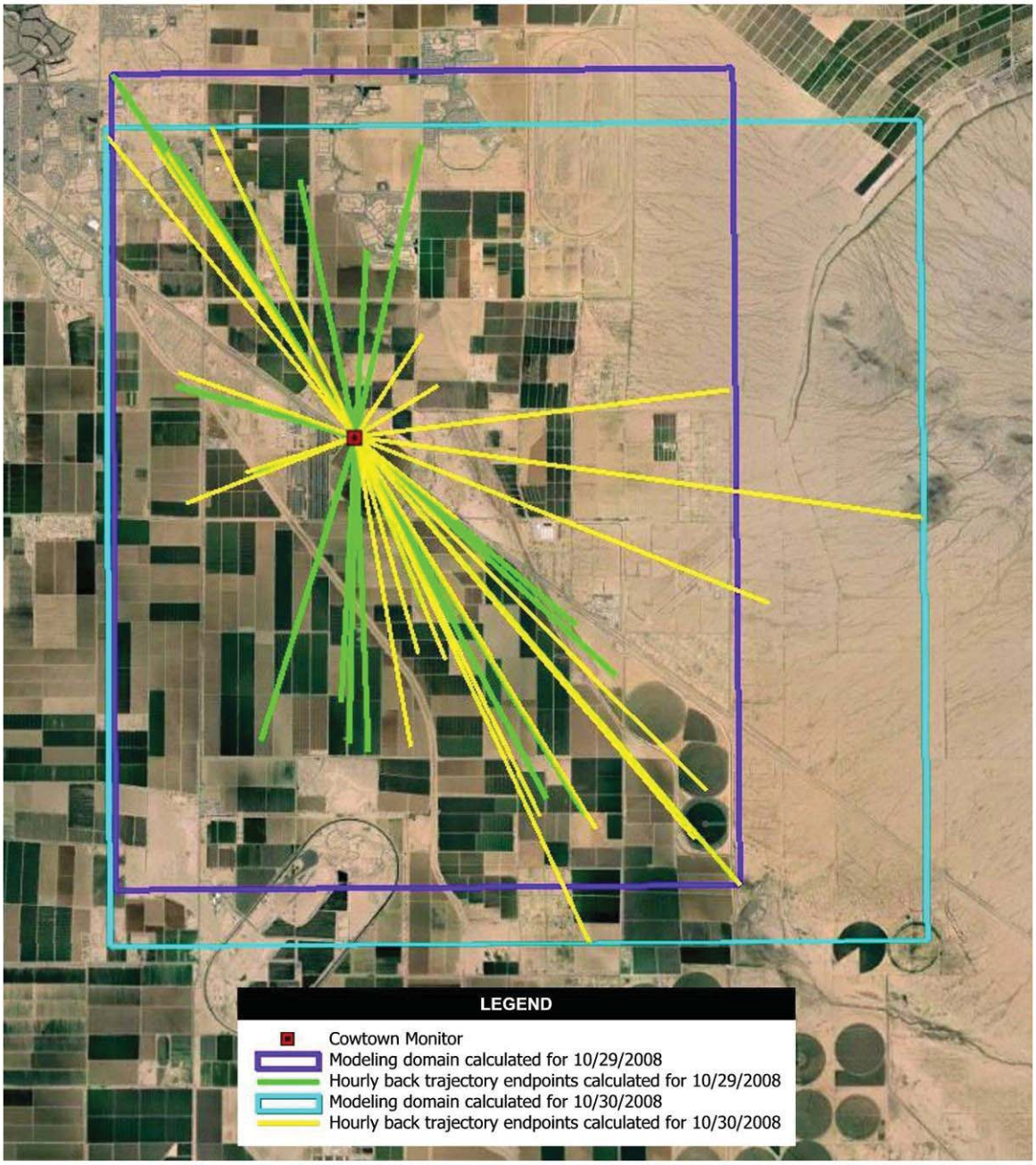

Figure BXIII-1: Comparison of Calculated Modeling Domains Between 10/29/2008 and 10/30/2008

BXIV. Shape Files Used in Inventory Development and Modeling

Shape Files Used in Inventory Development and Modeling

Shape files and location information for the land parcels and roads were obtained and used in the emission inventory and modeling analysis. Listed below are the sources of the shape files and location information used in the analysis.

Annual Emission Calculations

Shape file "Land_Use_5_28_13_w_rds.shp" described the land uses for each land use parcel in the modeling domain. This shapefile was developed by PCAQCD and ADEQ and was used to create the 2008 and 2018 PM_{10} emission estimates in the PM_{10} nonattainment area and the 2008 and 2011 $PM_{2.5}$ emission estimates in the $PM_{2.5}$ nonattainment area.

Design-Day Emission Calculations

Source-specific approaches are detailed below.

Agriculture/High Wind Emissions – Because the shape file "Land_Use_5_28_13_w_rds.shp" did not have crop information, Land_Use_5_28_13.shp was spatially joined with two crop distribution files (ADEQ PINAL 2008 4 SITE CROP_region.shp and PINAL 2008 DOMAIN CROP_region.shp) that were provided by Cotton Research and Protection Council. The joined shape file was used for both the agriculture and the high wind emission calculations.

Unpaved Roads – The file PM10_Roads_Shapefile.shp was used because Land_Use_5_28_13_w_rds.shp did not have ADT information and at the time the latter file was received from ADEQ, all of the ADT data and the identification of the different categories of unpaved public roads had been processed using the PM10_Roads_Shapefile.shp file. The two shape files (PM10_Roads_Shapefile.shp and Land_Use_5_28_13_w_rds.shp) were compared and it was found that information on unpaved roads within the modeling domains was identical within the modeling domain.

Paved Roads – MAG provided road network shape files for 2008, 2012, 2015, and 2018. 2008 and 2018 road network files included those areas surrounding the monitors and incorporated the local road network. 2012 and 2015 shape files included centroid data for the entire nonattainment area. A sample of the files are listed below.

- Vol_ALL_2015_NF_IA_PM10.cpg
- Vol_ALL_2015_NF_IA_PM10.dbf
- Vol_ALL_2015_NF_IA_PM10.prj
- Vol_ALL_2015_NF_IA_PM10.shp
- Vol_ALL_2015_NF_IA_PM10.shx

Where "ALL" indicates the hours of the day of traffic data included. "IA" indicates that the selected files include those roads located inside area A ("OA" indicates outside of area A). Within the file's

attribute table, LOV_AM indicates the vehicle type group (LOV, HOV, HVY, MED, LGT) and the hour group (AM, MD, PM, NT). The values presented under each of these headings indicates the ADT for that vehicle type group and hour group

AM = Morning Peak
MD = Mid-day
PM = Afternoon Peak
NT = Night through early AM

Construction Activities – PCAQD provided a dust permit GIS file.

CAFOs and Dairies – Aerial photography was used to digitize the locations of these facilities. These facilities were verified by ADEQ Water Quality records review for individual facilities.

Point Sources – PCAQMD permit records were reviewed to identify the point sources located within the modeling domains and Google Earth was used to digitize their locations.

Railroads – The unpaved road shape file was used to identify the location of rail facilities within each modeling domain.

Tribal Unpaved Roads – The location of these roads within the modeling domains was determined through aerial photography. The digitized tribal road network was included in the unpaved road network created for each modeling domain:

BXV. Documentation of Control Efficiency for Nissan and Volkswagen Test Tracks

Documentation of Control Efficiency for Nissan and Volkswagen Test Tracks

As noted in Section 3.13, two vehicle manufacturers operate test tracks within the PM_{10} nonattainment area and the Cowtown stagnation and high wind modeling domains: Nissan and Volkswagen. The methodologies employed to estimate exhaust emissions on the paved and unpaved roads of both facilities in 2018 were the same as those employed in the preparation of the 2008 emission estimates. Neither facility indicated a change in the level of travel on its roads from 2008 to 2018; therefore, the only difference is that the exhaust emissions in 2018 reflect the values generated by MOVES for 2018 model year vehicles instead of 2008 vehicles. No change was made to either the methodology or the estimates of fugitive dust produced by vehicles operating on paved roads at either facility.

Fugitive dust emissions from operations on unpaved roads followed the same methodology employed in the 2008 calculations for both facilities, with one exception. The Nissan facility has always treated its unpaved roads with aggregate base (AB).[16,17] Therefore, aggregate base (AB) controls were assumed for the unpaved roads in the Nissan facility for both the 2008 and 2018 emission calculations.

The road travel PM_{10} emission factor for the Nissan Motors rock chip test track was estimated to be 1.079 pound of PM_{10} per vehicle mile-traveled (VMT) based on the methodology used to compute unpaved road emission factors for public unpaved roads in the modeling domain emission inventories. The U.S. Environmental Protection Agency (U.S. EPA) unpaved road travel emission factor equation published in AP-42[18] was configured with local soil silt and moisture content data and assumed to be representative of uncontrolled dirt test track PM_{10} emissions. An estimate for the control efficiency of the AB gravel surface applied to each rock chip test track was developed through a literature review.

Few estimates of the control efficiency of gravel surfacing of unpaved roads have been broadly accepted and published in regulatory fugitive PM_{10} guidelines. This lack is due to the highly variable nature of the control efficiency, which is dependent on the variability of gravel layer thickness, thickness uniformity, subgrade soil bearing capacity, and several other soil structural properties. Limited soil silt content data representative of uncontrolled and gravel-controlled portions of the same road, as tabulated in AP-42 Section 13.2.2, produce a calculated control efficiency of 58% using that section's Equation 1b. This value is fairly close to a commonly used control efficiency of 50% quoted in semi-quantitative assessments of unpaved road emissions. In the absence of any more accurate methodology for estimating the control efficiency of gravel application at the Nissan Motors facility, the control efficiency of 58% is recommended for gravel application and maintenance at this facility.

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[16] Dust Control Plan, Nissan Technical Center North America, Arizona Test center, Revised, January 2014.

[17] Email communication between Ryan C. Templeton, and a representative from Nissan facility on February 27, 2014, suggests the dirt test tracks have always been covered with the MAG spec AB aggregate.

[18] Compilation of Air Pollutant Emission Factors, AP-42, U.S. Environmental Protection Agency, Section 13.2.3 Unpaved Roads, November 2006. *http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0202.pdf*

Maintenance protocols reported by the management of the test track facility to staff of the Arizona Department of Environmental Quality (ADEQ) indicate that fugitive PM_{10} emissions on the facility's gravel-controlled unpaved roads are also reduced through the weekly application of water. It is assumed that the weekly application is sufficient to wash soil silt particles almost entirely from open-pore surface aggregate on these roads, but that the surface aggregate returns to its equilibrium silt content within four days of watering. At this equilibrium return rate, the control efficiency of weekly watering is 28% (= [((100% + 0%)/2)*4 days + (0%*3 days)]/7 days). This separate control efficiency, when combined with that of gravel control, produces an overall control efficiency of 70% (= 100% - (100% - 58%)*(100% - 28%)). In the absence of any other data on these Nissan Motors unpaved road PM_{10} emission controls, a control efficiency of 70% representing uniformly applied and maintained gravel surface combined with weekly watering is recommended for use in adjusting the uncontrolled road travel PM_{10} emission factor for these unpaved roads to reflect the reductions achieved by this specific control strategy.

BXVI. West Pinal County PM_{10} Precursor Significance Determination

The Clean Air Act section 189(e) requires control of PM_{10} precursors from major stationary sources, except where such sources do not contribute significantly to PM_{10} levels exceeding the standard in an area. While a significant contribution is not defined in the Clean Air Act, 59 FR at 42011 suggests for a serious PM_{10} nonattainment area "a source category will be presumed to contribute significantly to a violation of the 24-hour NAAQS if its PM_{10} impact at the location of the expected violation would exceed 5 µg/m^3". 59 FR at 42010 further defines source categories as "categories of area-wide sources or large individual stationary sources of PM_{10} or PM_{10} precursor emissions".

In this section ADEQ presents justification for the exclusion of a PM_{10} precursor emission inventory from the West Pinal County PM_{10} State Implementation Plan. To this end, ADEQ has estimated the secondary PM_{10} impacts at the Cowtown and Pinal County Housing monitors based on worst impact day monitored data during a year-long chemical mass balance characterization study and sector-based annual emissions data from the 2008 Environmental Protection Agency (EPA) National Emission Inventory (NEI). These data were evaluated to determine which, if any, emissions sectors impact the monitors in question at a level exceeding 5 µg/m^3 and would thus be considered significant contributors to violations of the PM_{10} 24-hour NAAQS. Any source that did not contribute secondary PM_{10} to the monitor at this level of significance was not considered significant and therefore did not necessitate the creation of a precursor emission inventory.

Rice University, Arizona State University, Pinal County Air Quality Control District, and the EPA undertook a study entitled the "Desert Southwest Coarse Particulate Matter Study in Pinal County, AZ"[19]. One primary focus of the study was chemical characterization of particulate matter impacting local air quality monitors. Monitor sampling and subsequent sample chemical characterization occurred at one in six day intervals and over the span of an entire year (February 2009 – February 2010). Clements *et al.* reported average, maximum, and minimum coarse particle mass concentrations and corresponding chemical compositional breakdowns for the ambient sampling locations. ADEQ presents the reported information for the Cowtown and Pinal County Housing monitors for the maximum sampled ambient mass concentration days in Table BXVI-1. ADEQ also calculated the percentage of each constituent (i.e. Crustal, Organic Material, Nitrate, Sulfate, Ammonium, Other Species, or Unidentified) of the total measured particle fractions (e.g. total summed coarse and fine Crustal, Organic Material, Nitrate, Sulfate, Ammonium, Other Species, and Unidentified particle fractions) for Cowtown and Pinal County Housing (PCH) in the 'Percent of Max Measured Concentrations' columns. Finally, Table BXVI-1 provides design day normalized monitor impact concentrations for each measured particle fraction by multiplying the percent contribution of each particle fraction by the design day concentration for Cowtown (244.5 µg/m^3) and PCH (178.0 µg/m^3). The normalization was performed in order to scale the measured max concentrations in the chemical speciation study to the design days used for the West Pinal County PM_{10} SIP.

[19] Clements, A. L., Fraser, M. P., Upadhyay, N., Herckes, P., Sundblom, M., Lantz, J., & Solomon, P. A. (2014). Chemical characterization of coarse particulate matter in the Desert Southwest-Pinal County Arizona, USA.*Atmospheric Pollution Research*, *5*(1).

Table BXVI-1: Maximum Coarse and fine particle mass concentration and chemical compositional breakdown at each of the ambient sampling locations						
	Max Measured Concentrations		**Percent of Max Measured Concentrations**		**Design Day Normalized Concentrations**	
Coarse Particle Fraction	Cowtown (µg/m3)	PCH (µg/m3)	Cowtown (%)	PCH (%)	Cowtown (µg/m3)	PCH (µg/m3)
Ambient Mass	177.6	162.8	--	--	244.5	178.0
Crustal	94.4	110.6	41.5%	54.7%	101.6	97.4
Organic Material	57.0	14.5	25.1%	7.2%	61.3	12.8
Nitrate	2.8	4.8	1.2%	2.4%	3.0	4.2
Sulfate	2.5	2.3	1.1%	1.1%	2.7	2.0
Ammonium	0.5	0.3	0.2%	0.1%	0.5	0.3
Other Species	19.5	10.1	8.6%	5.0%	21.0	8.9
Unidentified	31.8	39.2	14.0%	19.4%	34.2	34.5
Fine Particle Fraction						
Ambient Mass	18.8	20.4	--	--	--	--
Crustal	4.5	11.8	2.0%	5.8%	4.9	10.4
Organic Material	5.9	2.1	2.6%	1.0%	6.3	1.9
Nitrate	0.6	0.2	0.3%	0.1%	0.6	0.2
Sulfate	1.0	0.5	0.4%	0.2%	1.1	0.4
Ammonium	0.4	0.2	0.2%	0.1%	0.4	0.2
Other Species	1.3	1.4	0.6%	0.7%	1.4	1.2
Unidentified	5.1	4.2	2.3%	2.1%	5.5	3.7
Sum Coarse & Fine						
Nitrate	3.4	5.0	1.5%	2.5%	3.7	4.4
Sulfate	3.5	2.8	1.6%	1.4%	3.8	2.4
Ammonium	0.8	0.5	0.4%	0.2%	0.9	0.4
Total Nitrate, Sulfate, Ammonium	7.8	8.2	3.4%	4.1%	8.4	7.2

Based on the design day normalization performed for Table BXVI-1, combined Nitrate, Sulfate, and Ammonium impacts on the Cowtown and PCH monitors are estimated to be 8.4 µg/m^3 and 7.2 µg/m^3 respectively. This level of impact amounts to 3.4% and 4.0% of the total particulate impact at the Cowtown and PCH monitors being attributable to secondary Particulate Matter (PM). While estimated secondary PM minimally impacts the monitors on design days, estimated monitor impacts exceeded the 5 µg/m^3 threshold for a single source category at both monitors. Therefore, ADEQ subsequently processed Pinal County 2008 EPA NEI reported emissions for NO_x, SO_2, and NH_3 to determine the percent

contribution of each source sector to the total emissions of these pollutants for the County (Table BXVI-2).

Table BXVI-2: Source Sector Emission Fraction to Countywide Pollutant Emissions			
EPA NEI Sector	**NH3**	**NOX**	**SO2**
Agriculture - Fertilizer Application	15.12%	0.00%	0.00%
Agriculture - Livestock Waste	77.76%	0.00%	0.00%
Biogenics - Vegetation and Soil	0.00%	8.19%	0.00%
Commercial Cooking	0.00%	0.00%	0.00%
Fires - Agricultural Field Burning	0.00%	0.01%	0.06%
Fires - Prescribed Fires	0.03%	0.06%	0.78%
Fires - Wildfires	0.24%	0.04%	1.28%
Fuel Comb - Comm/Institutional - Coal	0.00%	0.00%	0.03%
Fuel Comb - Comm/Institutional - Natural Gas	0.00%	0.99%	0.40%
Fuel Comb - Comm/Institutional - Oil	0.00%	0.20%	3.71%
Fuel Comb - Comm/Institutional - Other	0.00%	0.00%	0.00%
Fuel Comb - Electric Generation - Coal	0.00%	0.00%	0.00%
Fuel Comb - Electric Generation - Natural Gas	1.21%	1.07%	1.30%
Fuel Comb - Industrial Boilers, ICEs - Biomass	0.00%	0.00%	0.00%
Fuel Comb - Industrial Boilers, ICEs - Coal	0.00%	0.21%	15.51%
Fuel Comb - Industrial Boilers, ICEs - Natural Gas	0.02%	0.74%	0.39%
Fuel Comb - Industrial Boilers, ICEs - Oil	0.02%	0.62%	24.77%
Fuel Comb - Residential - Natural Gas	0.21%	0.30%	0.09%
Fuel Comb - Residential - Oil	0.00%	0.00%	0.06%
Fuel Comb - Residential - Other	0.00%	0.07%	0.02%
Fuel Comb - Residential - Wood	0.04%	0.02%	0.14%
Industrial Processes - Chemical Manuf	0.00%	0.00%	0.09%
Industrial Processes - Mining	0.00%	0.85%	4.59%
Industrial Processes - NEC	0.66%	0.26%	3.84%
Industrial Processes - Non-ferrous Metals	0.00%	0.00%	0.00%
Industrial Processes - Pulp & Paper	0.00%	0.01%	0.00%
Industrial Processes - Storage and Transfer	0.02%	0.00%	0.00%
Miscellaneous Non-Industrial NEC	0.00%	0.01%	0.03%
Mobile - Aircraft	0.00%	0.04%	0.33%
Mobile - Locomotives	0.01%	10.46%	4.71%
Mobile - Non-Road Equipment - Diesel	0.03%	9.44%	9.96%
Mobile - Non-Road Equipment - Gasoline	0.01%	0.52%	0.13%
Mobile - Non-Road Equipment - Other	0.00%	0.24%	0.02%
Mobile - On-Road Diesel Heavy Duty Vehicles	0.17%	30.30%	2.02%
Mobile - On-Road Diesel Light Duty Vehicles	0.01%	0.59%	0.05%
Mobile - On-Road Gasoline Heavy Duty Vehicles	0.09%	2.14%	1.21%
Mobile - On-Road Gasoline Light Duty Vehicles	2.83%	31.12%	22.54%
Solvent - Industrial Surface Coating & Solvent Use	0.00%	0.01%	0.00%
Waste Disposal	1.51%	1.49%	1.92%

Relative source sector contributions on the annual level were then assumed to be equivalent on the relative daily emissions. Also, NO_x, SO_2, and NH_3 emissions by a source category were assumed to be representative of Nitrate, Sulfate, and Ammonium impacts at an individual monitor. Based on these assumptions, ADEQ was able to estimate the percent contribution of Nitrate, Sulfate, and Ammonium of each source category on the Cowtown and PCH design days. This was calculated as the product of the individual sector fractions by pollutant and individual Nitrate, Sulfate, or Ammonium impacts at each monitor. While relative source sector contributions will vary temporally and spatially, ADEQ did not account for transport of pollutants from neighboring counties, States, or countries in this analysis and thus considers the results for any one source category to still be conservatively high.

Based on this analysis, no source category exceeds the 5 $\mu g/m^3$ threshold (Table BXVI-3). The highest estimated contributing source category, On-road Mobile, contributes < 3.5 $\mu g/m^3$ of secondary PM to either monitor on the design days. Therefore, no source category significantly contributes precursors to monitor exceedances, precluding ADEQ of the necessity of precursor inventory creation for any source categories.

Table BXVI-3: Source Sector Secondary Pollutant Impacts on the Cowtown and PCH monitors for the Design Days								
	Cowtown Concentration (µg/m3)				PCH Concentration (µg/m3)			
Emission Inventory Sector	NH_4	NO_3	SO_4	**Total Secondary**	NH_4	NO_3	SO_4	**Total Secondary**
Agriculture - Fertilizer Application	0.14	0.00	0.00	**0.14**	0.06	0.00	0.00	**0.06**
Agriculture - Livestock Waste	0.70	0.00	0.00	**0.70**	0.33	0.00	0.00	**0.33**
Total Agriculture	**0.84**	**0.00**	**0.00**	**0.84**	**0.39**	**0.00**	**0.00**	**0.39**
Biogenics - Vegetation and Soil	**0.00**	**0.30**	**0.00**	**0.30**	**0.00**	**0.36**	**0.00**	**0.36**
Commercial Cooking	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Fires - Agricultural Field Burning	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Fires - Prescribed Fires	0.00	0.00	0.03	**0.03**	0.00	0.00	0.02	**0.02**
Fires - Wildfires	0.00	0.00	0.05	**0.05**	0.00	0.00	0.03	**0.03**
Total Fires	**0.00**	**0.00**	**0.08**	**0.09**	**0.00**	**0.00**	**0.05**	**0.06**
Fuel Comb - Comm/Institutional - Coal	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Fuel Comb - Comm/Institutional - Natural Gas	0.00	0.04	0.02	**0.05**	0.00	0.04	0.01	**0.05**
Fuel Comb - Comm/Institutional - Oil	0.00	0.01	0.14	**0.15**	0.00	0.01	0.09	**0.10**
Fuel Comb - Comm/Institutional - Other	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Total Fuel Comb - Comm/Institutional	**0.00**	**0.04**	**0.16**	**0.20**	**0.00**	**0.05**	**0.10**	**0.15**
Fuel Comb - Electric Generation - Coal	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Fuel Comb - Electric Generation - Natural Gas	0.01	0.04	0.05	**0.10**	0.01	0.05	0.03	**0.08**
Total Fuel Comb - Electric Generation	**0.01**	**0.04**	**0.05**	**0.10**	**0.01**	**0.05**	**0.03**	**0.08**
Fuel Comb - Industrial Boilers, ICEs - Biomass	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Fuel Comb - Industrial Boilers, ICEs - Coal	0.00	0.01	0.59	**0.60**	0.00	0.01	0.38	**0.38**
Fuel Comb - Industrial Boilers, ICEs - Natural Gas	0.00	0.03	0.01	**0.04**	0.00	0.03	0.01	**0.04**
Fuel Comb - Industrial Boilers, ICEs - Oil	0.00	0.02	0.94	**0.96**	0.00	0.03	0.60	**0.63**
Total Fuel Comb - Industrial Boilers, ICEs	**0.00**	**0.06**	**1.54**	**1.60**	**0.00**	**0.07**	**0.99**	**1.05**
Fuel Comb - Residential - Natural Gas	0.00	0.01	0.00	**0.02**	0.00	0.01	0.00	**0.02**
Fuel Comb - Residential - Oil	0.00	0.00	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	0.00	**0.00**
Fuel Comb - Residential - Wood	0.00	0.00	0.01	**0.01**	0.00	0.00	0.00	**0.00**
Total Fuel Comb - Residential	**0.00**	**0.01**	**0.01**	**0.03**	**0.00**	**0.02**	**0.01**	**0.03**
Industrial Processes - Chemical Manuf	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Industrial Processes - Mining	0.00	0.03	0.17	**0.21**	0.00	0.04	0.11	**0.15**
Industrial Processes - NEC	0.01	0.01	0.15	**0.16**	0.00	0.01	0.09	**0.11**
Industrial Processes - Non-ferrous Metals	0.00	0.00	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	0.00	**0.00**

Table BXVI-3: Source Sector Secondary Pollutant Impacts on the Cowtown and PCH monitors for the Design Days								
	Cowtown Concentration (µg/m3)				**PCH Concentration (µg/m3)**			
Emission Inventory Sector	NH_4	NO_3	SO_4	**Total Secondary**	NH_4	NO_3	SO_4	**Total Secondary**
Industrial Processes - Storage and Transfer	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Total Industrial Processes	**0.01**	**0.04**	**0.32**	**0.37**	**0.00**	**0.05**	**0.21**	**0.26**
Miscellaneous Non-Industrial NEC	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Mobile - Aircraft	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	**0.01**
Mobile - Locomotives	**0.00**	**0.38**	**0.18**	**0.56**	**0.00**	**0.46**	**0.11**	**0.57**
Mobile - Non-Road Equipment - Diesel	0.00	0.35	0.38	**0.72**	0.00	0.41	0.24	**0.66**
Mobile - Non-Road Equipment - Gasoline	0.00	0.02	0.00	**0.02**	0.00	0.02	0.00	**0.03**
Mobile - Non-Road Equipment - Other	0.00	0.01	0.00	**0.01**	0.00	0.01	0.00	**0.01**
Total Mobile - Non-Road	**0.00**	**0.37**	**0.38**	**0.76**	**0.00**	**0.45**	**0.25**	**0.69**
Mobile - On-Road Diesel Heavy Duty Vehicles	0.00	1.11	0.08	**1.19**	0.00	1.33	0.05	**1.38**
Mobile - On-Road Diesel Light Duty Vehicles	0.00	0.02	0.00	**0.02**	0.00	0.03	0.00	**0.03**
Mobile - On-Road Gasoline Heavy Duty Vehicles	0.00	0.08	0.05	**0.13**	0.00	0.09	0.03	**0.12**
Mobile - On-Road Gasoline Light Duty Vehicles	0.03	1.14	0.86	**2.02**	0.01	1.37	0.55	**1.93**
Total Mobile - On-Road	**0.03**	**2.35**	**0.98**	**3.36**	**0.01**	**2.82**	**0.63**	**3.46**
Solvent - Industrial Surface Coating & Solvent Use	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Waste Disposal	**0.01**	**0.05**	**0.07**	**0.14**	**0.01**	**0.07**	**0.05**	**0.12**
Total	0.90	3.66	3.80	**8.36**	0.42	4.40	2.42	**7.24**

Report No. SR2014-08-03

Appendix C:

Pinal County PM_{10} Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days

Prepared for:

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August 2014

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December, 2015

Report No. SR2014-08-03

Pinal County PM_{10} Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days

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Pinal County PM_{10} Nonattainment Area

Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days

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1. INTRODUCTION

The goal of this effort was to structure a U.S. Environmental Protection Agency (EPA) approved plume dispersion model to compute PM_{10} air quality impacts from arrays of significant emissions sources near existing permanent monitoring stations for use in improving base-year emission inventories and assessing the benefits of alternative control strategies in the Western Pinal County PM_{10} Nonattainment Area (Pinal County). From previous review of U.S. EPA guidance and discussions with EPA Region 9 staff, the Arizona Department of Environmental Quality (ADEQ) team preparing the Pinal County attainment plan (State Implementation Plan or SIP) chose 2008 as the base-year for planning purposes.[1]

The dual goals of this modeling effort were critical to the integrity of the completed plan. Separate emission inventories had been prepared for the areas surrounding and impacting four Pinal County Air Quality Control District (PCAQCD) monitoring stations in nonattainment status, and the predominance of area source emissions in these inventories required the use of dispersion modeling for stagnation meteorological conditions and distance-weighted approach for high wind conditions, to overcome the significant uncertainties in inventory accuracy that are inherent to these highly variable source categories. Also, because of the spatial distribution patterns of area sources surrounding the monitors, dispersion modeling was critical to the assessment of benefits of emission control measures that will differentially reduce emissions impacts at different monitors.

The need for a comprehensive modeling effort in support of attainment planning was further underscored by a prior determination that PM_{10} exceedances were caused at three of the four monitoring sites by two different sets of meteorological conditions. In late fall and winter months, the presence of regional high pressure cells combined with the absence of storm fronts passing through central Arizona produces stagnation (or low wind) conditions that reduce nocturnal mixing heights to tens of meters above the ground and concentrate emitted pollutants at ground-level. In the spring and summer, high wind conditions are periodically generated by monsoonal thunderstorms or strong eddy currents associated with the retreating circumpolar vortex. Because these two types of events are not typically accompanied by precipitation over Pinal County, both cause significant increases in windblown emissions sufficient to produce exceedances of PM_{10} standards.

Air quality modeling combines information on meteorological conditions (e.g., wind speed, wind direction, mixing height, etc.) with emission estimates to calculate downwind pollutant concentrations at selected locations. For this planning process, AERMOD and

[1] See Appendix A of this SIP submittal, "Pinal County PM Inventory Preparation Plan," prepared for the Arizona Department of Environmental Quality, Sierra Research, December 2012.

an EPA-approved modified weighted rollback approach for high wind conditions were selected to estimate hourly PM_{10} concentrations at monitoring stations produced by emissions of area, point, and mobile sources located within specified modeling domains surrounding the monitoring stations. Because the PM_{10} ambient air quality standard exceeded in Pinal County is designed to limit short-term acute exposures and is measured over 24-hour averaging periods, the attainment demonstrations are required by EPA policy to show how PM_{10} concentrations would be reduced from levels recorded on exceedance days in the base year experiencing the strongest stagnation or high wind meteorological conditions. The selection of these "design days" is discussed in Appendix B of this SIP submittal[2].

Different approaches were used to estimate emission impacts at monitors on low wind and high wind design days. On low wind days, AERMOD was run with meteorological data recorded at the subject monitor and emissions rates for each source within the modeling domain were calculated from reported activity data and best-representative emissions factors. For both high wind hours (>12 mph) and low wind hours (≤12 mph) on high wind days, a weighted rollback method was used to assess the relative contribution of each upwind source area to the hourly monitored PM_{10} contribution under assumptions of (1) emission factor uniformity within "disturbed" and "undisturbed" states of surface soil conditions and (2) an inverse relationship between the source's distance from the monitor and the emission impact at that monitor.

The weighted rollback method for high wind day analysis is based on modeling experiences related to development of the Maricopa Association of Government's (MAG) Five Percent Plan. Through experience gained in the preparation of PM_{10} SIPs, and in consultation with EPA, MAG determined that neither AERMOD nor photochemical grid models performed well in quantifying discrete area source contributions at downwind monitors under high wind conditions, and that attainment demonstrations relying on use of these models were not reliable. For this reason, MAG developed an alternate but more reliable approach that weights the contribution of each upwind source's emissions by the reciprocal of its distance to the monitor and assumes that each source's fractional contribution to the sum of weighted emissions is equal to that source's fractional contribution to the hourly PM_{10} concentration measured at the downwind monitor (i.e., that the impacts of emissions from nearby sources are proportionally greater than the impacts from remote sources, assuming equivalent emissions rates among sources). Individual source contributions, using this approach, can be determined through review of hourly and daily estimates of weighted emissions rates.

Under each of these methodologies, the degree of emissions reductions needed to achieve attainment of the 24-hour PM_{10} standard at designated monitors on respective stagnation and high wind design days—both in overall terms or by individual area source—can be quantified. Evaluation and selection of suites of control measures capable of demonstrating attainment at all monitors on all design days involve many different factors and are the subject of Appendix D of this SIP submittal[3].

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[2] "Pinal County PM_{10} Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days," Sierra Research, prepared August 2014 and revised October 2015.
[3] "Pinal County PM_{10} Nonattainment Area 2018 Attainment Demonstration and Controlled Emission Inventories," ADEQ, prepared August 2015 and revised October 2015.

The remainder of this report discusses the data sources, analyses, and the modeling methodologies used in the Pinal County PM_{10} plan for control strategy evaluation and attainment demonstration. Section 2 summarizes the development of an assessment methodology addressing stagnation design days, and Section 3 reviews the methodology developed to evaluate solutions for high wind design days. At the conclusion of each section, the methodologies are used to calculate design day impacts at each monitor, on the basis of PM_{10} emission inventories,[4] for comparison to hourly PM_{10} concentrations recorded at the stations on these design days in the 2008 base year and the projected year 2018; a brief summary of significant changes in emissions and related source apportionment shifts is also provided.

[4] "Pinal County PM_{10} Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days," Sierra Research, prepared August 2014 and revised October 2015.

2. STAGNATION DAY MODELING

A review of EPA guidelines and related fugitive dust modeling employed in attainment demonstrations prepared for Maricopa County determined that AERMOD is the most suitable model for evaluating hourly source contributions to PM_{10} exceedances recorded at Pinal County monitors on stagnation design days. AERMOD is a steady-state Gaussian plume dispersion model that assesses pollutant concentrations from a variety of source types. Adopted by EPA as a regulatory model on December 9, 2005, AERMOD contains improved algorithms for addressing low wind speed (near-calm conditions) and provides estimates for conditions when wind speeds are less than 1 m/sec,[5,6] which was often the case on the selected stagnation design days. ADEQ's analysis employed the AERMOD version dated 14134 (May 14, 2014), and the AERMET (see below) version bearing the same date.

2.1 AERMOD Inputs

Key inputs required for the successful use of AERMOD are summarized below.

- Emission Inventory[7] – Hourly estimates of emissions were prepared using land parcel data provided by ADEQ and PCAQCD, activity data collected through field surveys, contacts with stakeholders, etc., and cited fugitive dust emission factors.

- AERMET-formatted Meteorological Data – AERMET is a preprocessor that converts raw meteorological measurements into formatted meteorological input files for AERMOD. Outlined below are the data sources used to configure AERMET to produce these input files.

  - The on-site meteorological data collected at the Cowtown, Pinal County Housing, and Stanfield monitoring stations were used, with parameters of wind direction, wind speed, and temperature. A wind speed threshold of 0.5 meters/second was specified for the upper limit of calm conditions.

  - Upper air meteorological data were derived from Tucson 2008 twice-daily soundings by the National Weather Service (NWS).

  - Cloud cover meteorological data were obtained from the records of the Phoenix NWS meteorological station at Sky Harbor Airport.[8]

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[5] "Revisions to the Guideline on Air Quality Models: Adoption of Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions," U.S. Environmental Protection Agency, Federal Register, Vol. 70, No. 216, p. 68218, November 9, 2005 (Attachment IV).
[6] U.S. EPA, User's Guide for AERMET, EPA-454/B-03-002, November 2004.
[7] "Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days," ibid.
[8] Cloud cover data were obtained for both Casa Grande airport and Phoenix Sky Harbor airport for 2008.

- The surface characteristics of albedo, Bowen Ratio and surface roughness appropriate to the areas surrounding the Cowtown, Pinal County Housing, and Stanfield monitoring stations were obtained from AERSURFACE.[9] Albedo is the portion of sunlight that is reflected from the surface of the ground, Bowen ratio is a measure of moisture available for evaporation, and surface roughness is a measure of the depth of the thin boundary layer at the ground surface that is protected from influences of wind-generated frictional drag by the small variability in ground surface elevation.[10,11] These parameters are functions of ground cover (land use) and affect the concentration calculations. The monthly average values of these parameters were calculated by AERSURFACE for each of the Cowtown, Pinal County Housing, and Stanfield monitoring sites and are listed below in Tables 2-1, 2-2, and 2-3, respectively. Only data from October were used to represent the stagnation design day conditions.

  - The wind measurement height[12] for each monitor was input as the onsite instrument height parameter to AERMET. AERMOD adjusts the wind speed at these measurement heights to other heights based on the AERMOD profile equation for wind speed.[13]

- After processing the data through AERMET, the missing data percentage was lower for the Phoenix Sky Harbor airport data: 10.76% compared to 13.97% for the Casa Grande data.
- According to *http://www.faa.gov/air_traffic/weather/asos/?state=AZ* , Casa Grande airport is an Automated Weather Observing System (AWOS III) station, and Phoenix Sky Harbor airport is an Automated Surface Observing System (ASOS) station. The AWOS systems are among the oldest automated weather stations in the United States, and many of them predate ASOS *http://en.wikipedia.org/wiki/Automated_airport_weather_station*. The Phoenix Sky Harbor airport most likely has a better observation system.
- AERMOD was used to assess the impact of the Sky Harbor and Casa Grande data. The results show there is less than 5% difference in terms of modeling impacts between the two AERMET data sets.

Considering all of the factors above, Phoenix sky harbor airport data were chosen because of the better data quality and better observation system.

[9] U.S. EPA, AERSURFACE User's Guide, *http://www.epa.gov/scram001/7thconf/aermod/aersurface_userguide.pdf*.

[10] Appendix W to Part 51—Guideline on air Quality Models, §8.3.c.

[11] U.S. EPA. AERMOD Implementation Guide, March 19, 2009.

[12] Reported by PCAQCD to be 3.3 meters, 3.5 meters, and 9.2 meters at the PCH, Cowtown, and Stanfield monitoring stations, respectively.

[13] AERMOD Description of Model Formulation, Page 24, 4.1.1 Wind Speed Profiling. *http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_mfd.pdf*.

Table 2-1. AERMET Stage 3 Meteorological Processing Parameters for the Cowtown Monitoring Site in October				
Sector	Sector Definition	Albedo	Bowen Ratio	Roughness Length (m)
1	0° - 30° (NNE)	0.19	1.37	0.7
2	30° - 60° (NE)	0.19	1.37	0.659
3	60° - 90° (ENE)	0.19	1.37	0.7
4	90° - 120° (ESE)	0.19	1.37	0.406
5	120° - 150° (SE)	0.19	1.37	0.309
6	150° - 180° (SSE)	0.19	1.37	0.295
7	180° - 210° (SSW)	0.19	1.37	0.301
8	210° - 240° (SW)	0.19	1.37	0.272
9	240° - 270° (WSW)	0.19	1.37	0.276
10	270° - 300° (WNW)	0.19	1.37	0.683
11	300° - 330° (NW)	0.19	1.37	0.47
12	330° - 360° (NNW)	0.19	1.37	0.583

Table 2-2. AERMET Stage 3 Meteorological Processing Parameters for the Pinal County Housing Monitoring Site in October				
Sector	Sector Definition	Albedo	Bowen Ratio	Roughness Length (m)
1	0° - 30° (NNE)	0.19	1.37	0.07
2	30° - 60° (NE)	0.19	1.37	0.069
3	60° - 90° (ENE)	0.19	1.37	0.07
4	90° - 120° (ESE)	0.19	1.37	0.063
5	120° - 150° (SE)	0.19	1.37	0.083
6	150° - 180° (SSE)	0.19	1.37	0.092
7	180° - 210° (SSW)	0.19	1.37	0.08
8	210° - 240° (SW)	0.19	1.37	0.074
9	240° - 270° (WSW)	0.19	1.37	0.053
10	270° - 300° (WNW)	0.19	1.37	0.07
11	300° - 330° (NW)	0.19	1.37	0.061
12	330° - 360° (NNW)	0.19	1.37	0.066

Table 2-3. AERMET Stage 3 Meteorological Processing Parameters for the Stanfield Monitoring Site in October				
Sector	Sector Definition	Albedo	Bowen Ratio	Roughness Length (m)
1	0° - 30° (NNE)	0.19	1.37	0.07
2	30° - 60° (NE)	0.19	1.37	0.069
3	60° - 90° (ENE)	0.19	1.37	0.07
4	90° - 120° (ESE)	0.19	1.37	0.063
5	120° - 150° (SE)	0.19	1.37	0.083
6	150° - 180° (SSE)	0.19	1.37	0.092
7	180° - 210° (SSW)	0.19	1.37	0.08
8	210° - 240° (SW)	0.19	1.37	0.074
9	240° - 270° (WSW)	0.19	1.37	0.053
10	270° - 300° (WNW)	0.19	1.37	0.07
11	300° - 330° (NW)	0.19	1.37	0.061
12	330° - 360° (NNW)	0.19	1.37	0.066

- AERMOD Particle Deposition Algorithm was activated to simulate the impacts of particle deposition on calculated PM_{10} concentrations. Table 2-4 summarizes the particle parameters for modeling the Concentrated Animal Feeding Operations (CAFOs).[14] For all other source categories, two sources of particle size data were available: (1) the particle size data collected by dust jar at Durango Complex and West 43rd Avenue monitors in 2008 detailed in the MAG Five Percent Plan, as listed in Table 2-5; and (2) the particle size data collected by the Aerodynamic Particle Sizer (APS) Spectrometer at Casa Grande Airport in July 2008, as listed in Table 2-6.

Table 2-4. Particle Parameters for Modeling Concentrated Animal Feeding Operations

Particle size (µm)	0 - 1.8	1.8 - 3.1	3.1 - 6.2	6.2 - 9.9
Mass Fraction	0.14	0.07	0.27	0.52
Particle Density (mg/m^3)	2.5	2.5	2.5	2.5

Table 2-5. Particle Size Distributions Collected from Dust Jars for 2007 MAG Five Percent Plan

Particle size (µm)	0 - 2.5	2.5 - 5.0	5.0 - 7.5	7.5 – 10.0
Mass Fraction	0.14	0.18	0.28	0.4

Table 2-6. Particle Size Distributions Collected by Aerodynamic Particle Sizer Spectrometer at Casa Grande Airport in July 2008

Particle size (µm)	0 - 1.84	1.84 - 3.28	3.28 - 6.26	6.26 – 9.65
Mass Fraction	0.027	0.134	0.281	0.558

While the results from both of these studies are similar, the land use surrounding the Durango Complex and West 43rd Avenue monitors more closely represents areas adjacent to the Cowtown, Pinal County Housing, and Stanfield monitors. Therefore, the particle parameters used in the MAG Five Percent Plan, as shown in Table 2-7, were used in Pinal modeling.

Table 2-7. Particle Parameters Used for Modeling Non-CAFO Source Categories

Particle size (µm)	0 - 2.5	2.5 - 5.0	5.0 - 7.5	7.5 – 10.0
Mass Fraction	0.14	0.18	0.28	0.40
Particle Density (mg/m^3)	2.5	2.5	2.5	2.5

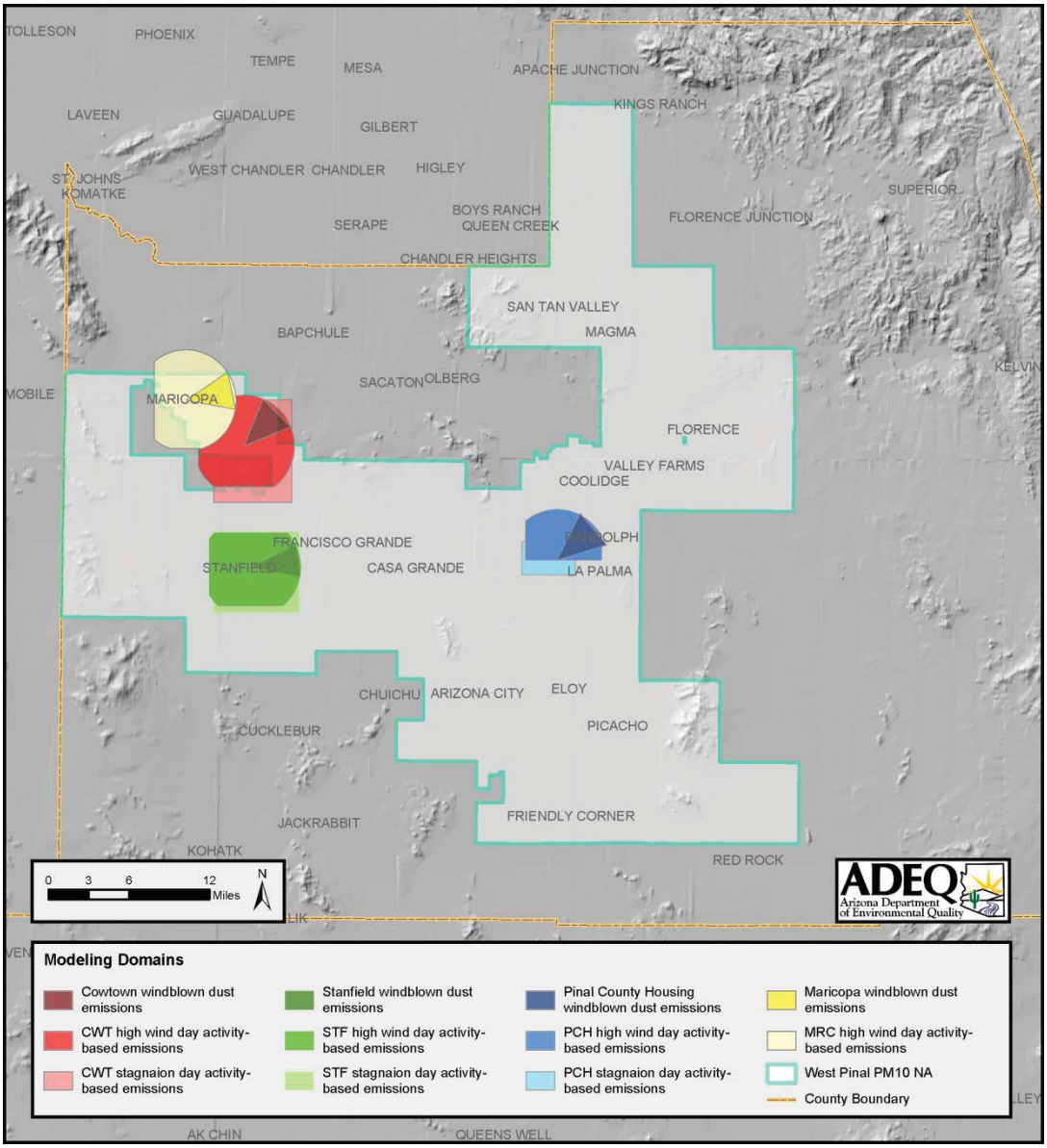
[14] "Particulate matter emission rates from beef cattle feedlots in Kansas - Reverse dispersion modeling," H.F. Bonifacio et al, Journal of the Air & Waste Management Association (JAWMA) Vol. 63, No. 3, p. 350-361.

- Flag pole receptor heights of 3 meters, 3.5 meters, and 4.8 meters for Pinal County Housing, Cowtown, and Stanfield sites, respectively, were used to represent the measurement height for each PM_{10} monitor. The following UTM Coordinates, (in NAD 83, zone 12) were assigned to receptor points representing these three PM_{10} monitors:

  - Pinal County Housing: 446631.83 (East), 3639334.80 (North);
  - Cowtown: 409201.93 (East), 3652874.86 (North);
  - Stanfield: 409999.82 (East), 3638528.80 (North).

  Figure 2-1 shows the relative locations of each monitoring site, as well as the extent around each for which emissions sources were modeled. The map also shows a fourth monitor, at the Maricopa County Complex site, which was modeled only for a high-wind exceedance day.

Figure 2-1. Design Day Modeling Domains in the Nonattainment Area



- Source parameters for select source categories are described below.

  - Unpaved Roads: Road links were modeled as area sources with release heights of 2 meters. The widths of these links were extracted from an ARCGIS shape file provided by PCAQCD and expanded by 10 foot mixing zones on each side,[15,16] and the lengths of these links were also extracted from the ARCGIS shape file provided by PCAQCD.

  - Agriculture: Agricultural parcels were modeled as area sources with release heights of 2 meters. The horizontal dimensions of these area sources were extracted from the ARCGIS shape file provided by ADEQ.

  - Construction: Construction sites were modeled as area sources with release heights of 2 meters. The horizontal dimensions of these area sources were extracted from the ARCGIS shape file provided by PCAQCD. The method for determining the activity status of construction sites is discussed in Section 3 of Appendix B.

  - CAFOs and Dairies: Feedlots and commercial dairy operations were modeled as area sources with release heights of 2.3 meters, based on recommendations contained in a feedlot emission and modeling study conducted in Kansas by Bonifacio et al.[17] The horizontal dimensions of these facilities were extracted from an ARCGIS shape file provided by ADEQ.

  - Industrial facilities: Stack and exhaust parameters for stationary equipment were derived from data contained in PCAQCD permit files and from PCAQCD surveys. Facility-specific data are presented and discussed in Section 3 of Appendix B.

  - Paved Roads: Road links were modeled as area sources with release heights of 2 meters. The widths of these links were extracted from an ARCGIS shape file and expanded by 10 foot mixing zones on each side;[18] the lengths of these links were also extracted from the PCAQCD ARCGIS shape file.

  - Nonroad: As discussed in Appendix B, the nonroad emissions are so small that they were not included in the modeling simulation.[19]

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[15] Ten foot wide mixing zones extending beyond the roadway outer edges have been found through research studies to be impacted by the bow wakes of trucks and cars in a manner that mixes vehicle exhaust pollutants and entrained road dust into these near-road areas, producing well mixed, uniform concentrations across the mixing zones and roadway surface prior to upward and downwind dispersion. *http://www.epa.gov/scram001/userg/regmod/caline3.pdf*.

[16] CALINE3 treats the region directly over the highway as a zone of uniform emissions and turbulence. This is designated as the mixing zone, and is defined as the region over the traveled way (traffic lanes, not including shoulders) plus three meters on either side. *http://www.epa.gov/scram001/userg/regmod/caline3.pdf*.

[17] Bonifacio, H.F, et al., ibid.

[18] See footnotes 15 and 16. *http://www.epa.gov/scram001/userg/regmod/caline3.pdf*.

[19] Nonroad emissions accounted for less than 0.1% of the design day inventory for each stagnation modeling domain.

2.2 Post-Processing Methodology

Once AERMOD runs were completed, modeled PM_{10} concentrations at the monitor were adjusted to account for particles that remained airborne for longer than an hour, as well as the contributions of sources located outside of modeling domains, as described below.

- Background – Although wind speeds during stagnant periods were extremely low, they were sufficient to allow for the transport of non-anthropogenic emissions from outside of the nonattainment area to the three low wind modeling domains. To account for the contribution of transported PM_{10}, non-anthropogenic background PM_{10} concentrations recorded at Organ Pipe Cactus National Monument were evaluated. This monitor, located 68 miles southwest of Tucson, is impacted by very little anthropogenic activity. The monitor is part of the IMPROVE monitoring network[20]. Filter-based measurements are collected every 3 days and 24-hour average concentrations of both PM_{10} and $PM_{2.5}$ are stored online. PM_{10} data were downloaded from the IMPROVE network for October and November 2008, representing twenty (20) 24-hour averages. Using meteorological data collected on the same dates in Tucson (the closest representative monitoring site), the 20 Organ Pipe measurements were screened to eliminate days with high wind conditions. Analysis of the meteorological data identified one day with 10 hours of winds exceeding the 12 mph high wind threshold velocity, and a second day had one hour of winds exceeding the 12 mph threshold. On the basis of this analysis, the one day with 10 hours of high winds was excluded from the calculation of background conditions. The average of 24-hour concentrations for the remaining 19 days was 11.5 $\mu g/m^3$. This average concentration was subtracted from the monitored PM_{10} concentrations at each of the stagnation monitors to isolate the concentration due to local sources.

- Carryover – A comparison between the modeled concentrations and the monitored concentrations (less background) found significant shortfalls in the modeled estimates. This was thought to be the result of extremely low wind speeds which promote carryover (i.e., locally-emitted particulate matter remaining in the atmosphere for multiple hours and continuing to contribute to monitored concentrations before being removed by particle deposition). AERMOD does not account for carryover; concentrations are estimated for each hour based on particulate mass emitted within the modeling domain in that hour. To address the effect of carryover, modeled concentrations from the previous hour were added to the succeeding hour. The carryover concentrations, however, were adjusted to account for particle deposition that would occur over the second hour of suspension. Information on particle size distribution, mixing height, and particle deposition velocity was used to estimate the amount of deposition that would occur in the second hour. As noted above, two estimates of particle size distribution were used to configure AERMOD—values from feedlot emission studies[21] were used to represent CAFOs emissions, and values reported in the MAG Five Percent Plan based on sampling conducted with a dust jar in 2008 at Durango and West 43rd

[20] *http://vista.cira.colostate.edu/improve/default.htm*.
[21] Bonifacio, H.F, et al., ibid.

Avenue were used to represent emissions from all other sources. Mixing height estimates for each of the design days were computed using AERMET. Estimates of settling velocities by particle size range were calculated using an online deposition velocity model.[22] The results of the analysis showed that PM_9 (i.e., particles 0 – 9 μm) would remain suspended in the second hour and that only PM_{9-10} would settle out during this period. Because the fraction of an area source's PM_{10} emissions that settles out by the second hour is dependent on the emissions' particle size distribution, separate second-hour deposition fractions were calculated for CAFO and non-CAFO source emissions. These analyses reported that 87% of CAFO PM_{10} emissions would remain suspended during the second hour following release, and 84% of PM_{10} emissions from all other sources would remain suspended.

- Normalize – A comparison between the diurnal profiles of the modeled and monitored PM_{10} concentrations, after adjusting for background and carryover contributions, showed that the estimates still differed. To reconcile these differences and to match the overall estimated concentrations with the 24-hour average design day PM_{10} measured concentration, the modeled values were normalized to match the 24-hour monitored values. This was accomplished by calculating the % difference between the average 2008 24-hour modeled concentrations (after adding carryover) and monitored concentrations (after subtracting out background) and using the % difference to adjust each estimated hourly concentration. The 2008 modeled:monitored ratio was also applied to 2018 modeled emissions for consistency between 2008 and 2018 modeling impacts.

2.3 Results

Tabular summaries of estimated hourly concentrations are presented in Tables 2-8 through 2-10 (2008 base year) and Tables 2-11 through 2-13 (the projected year of 2018) for Cowtown, Pinal County Housing, and Stanfield, respectively. These tables provide information on monitored wind speed, wind direction, PM_{10} concentration, modeled mixing height, and source-specific concentrations. Also included are the total hourly estimated concentrations, total daily source concentration, and overall source apportionment. Monitored and modeled concentrations and mixing height are depicted graphically in Figures 2-2 through 2-4 (2008 base year) and Figures 2-6 through 2-8 (the projected year of 2018). Figure 2-5 (2008 base year) and Figure 2-9 (the projected year of 2018) depict the average daily source-specific contributions for each site.

Changes in source apportionment between 2008 and 2018 are the result of changes in source-specific emissions and their proximity to each monitor. A summary of the changes in emissions and related source apportionment shifts is provided below.

- Paved roads emissions are projected to increase from 2008 to 2018 for all modeling domains. Depending on the modeling domain, the modeling impacts from the paved roads increased about 25% to 65% from 2008 to 2018.

[22] *http://www.filtration-and-separation.com/settling/settling.htm*, accessed August 2013.

- Residential and Commercial construction emissions are forecast to decrease due to the decline in construction activity and the decreased number of projected dust permits from 2008 to 2018, while the relative source locations are held constant. However, road construction activity is planned for a wide variety of roads in 2018, including some roads nearby the monitoring sites. As a result, the total construction modeling impacts approximately doubled in the Cowtown and Stanfield domains. In the PCH domain, where 2008 construction impacts were modeled to be negligible, but where some 2018 road work approaches the monitor, the increase was by orders of magnitude.

- Feedlot closures are forecast to reduce CAFO emissions in the CWT domain between 2008 and 2018. Feedlot expansions in the STF domain are projected to increase CAFO emissions between 2008 and 2018. These changes are projected to more than double the impact of CAFOs at STF and to reduce CAFO impacts by over 30% at CWT. One 2008 CAFO in the STF domain was repurposed as a dairy, increasing the modeled impact of dairies more than sixfold at that monitor. Even then, however, the impact of dairies remains negligible.

- On agricultural unpaved roads and unpaved trails, emissions are held constant from 2008 to 2018. On both public and private roads, however, a traffic increase of nearly 17% is projected. This growth is mitigated in places by planned or accomplished projects to put controls in place (including road improvements and the application of synthetic dust suppressants). Overall, from 2008 to 2018, the impact of unpaved roads are modeled to increase by 10% at CWT and 7% at STF, and to decrease by 24% at PCH.

- The emissions for other sources, including agriculture, unpaved parking lots, and permitted sources, are held constant from 2008 to 2018; the resulting modeling impacts for these sources do not change from 2008 to 2018.

Table 2-8. Stagnation Day Modeling Performance at Cowtown (CWT) on 10/30/2008 Design Day, AERMOD Simulation of Monitored Concentrations (µg/m³)

Hour	Wind Speed (m/s)	Wind Direction (degrees)	Mixing Height (m)	Monitor Observation	Point	Background	Construction	CAFOs	Non-tribal Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Unpaved Tribal Roads	Vehicle Test Tracks	Unpaved Parking Lots	Paved Roads	Total
1	2.4	139.7	419	210.7	0.0	11.5	0.0	14.5	0.0	0.0	0.0	1.6	0.0	0.0	0.2	0.0	0.0	0.8	28.6
2	2.2	140.2	341	296.4	0.0	11.5	0.0	4.0	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.0	0.0	0.4	16.7
3	2.3	155.5	378	184.2	0.0	11.5	0.0	7.8	0.0	0.0	0.0	0.7	0.1	0.0	0.2	0.0	0.0	0.3	20.6
4	1.8	154.4	225	169.9	0.0	11.5	0.0	28.7	0.0	0.0	0.0	1.4	0.0	0.0	0.2	0.0	0.0	0.4	42.1
5	2.1	135.6	310	89.1	0.0	11.5	0.0	37.7	0.0	0.0	0.0	2.0	0.1	0.0	0.2	0.0	0.0	0.8	52.2
6	1.1	148.6	93	191.5	0.0	11.5	0.0	269.9	0.0	0.0	0.0	22.5	0.6	0.0	2.2	0.0	0.1	6.0	312.9
7	1.0	158.3	43	265.2	0.0	11.5	0.0	422.1	0.0	1.0	30.0	56.3	0.5	0.0	13.9	0.0	0.7	9.7	545.9
8	0.4	58.8	53	421.2	0.0	11.5	0.0	174.1	0.3	0.9	54.1	38.2	1.5	0.1	10.2	3.5	0.7	4.4	299.4
9	0.5	33.7	134	239.1	0.1	11.5	6.4	0.0	0.6	0.0	34.1	8.5	2.6	0.2	0.0	10.5	0.1	0.5	75.2
10	2.4	98.6	505	120.2	0.0	11.5	5.5	0.0	0.5	0.0	9.7	3.2	1.3	0.1	0.0	6.3	0.0	0.3	38.4
11	1.9	112.3	388	88.7	0.1	11.5	0.1	0.0	0.2	0.0	2.9	1.1	0.3	0.0	0.0	0.0	0.0	0.1	16.2
12	1.6	83.4	493	25.9	0.1	11.5	0.0	0.0	0.1	0.0	3.1	1.6	0.4	0.0	0.1	0.0	0.0	0.0	17.1
13	1.5	325.6	886	86.2	0.1	11.5	2.0	0.0	0.1	0.0	3.5	0.9	0.3	0.0	0.1	0.0	0.0	0.1	18.5
14	1.6	320.7	1225	63.8	0.5	11.5	2.7	0.2	0.0	0.0	4.1	0.3	0.2	0.0	0.0	0.0	0.0	0.3	20.0
15	1.4	335.4	1446	30.8	0.7	11.5	1.4	0.2	0.0	0.0	3.8	0.2	0.2	0.0	0.0	0.0	0.0	0.3	18.3
16	1.1	325.9	1580	49.8	0.3	11.5	1.5	0.4	0.0	0.0	4.8	0.5	0.3	0.0	0.0	0.0	0.0	0.4	19.7
17	1.4	326.7	1621	78.5	0.0	11.5	1.9	0.4	0.0	0.0	5.3	0.5	0.3	0.0	0.0	0.0	0.0	0.5	20.4
18	0.8	290.4	69	298.2	1.3	11.5	0.9	390.0	0.1	0.0	42.2	36.7	1.9	0.0	0.0	0.0	0.2	20.2	505.0
19	0.5	252.5	17	1342.7	1.2	11.5	0.0	1169.8	0.1	0.0	33.6	60.5	3.1	0.0	0.1	0.0	0.3	25.6	1305.7
20	0.8	249.1	28	286.5	0.1	11.5	0.0	1427.2	0.0	0.0	0.0	37.6	3.0	0.0	0.2	0.0	0.1	12.3	1491.9
21	0.5	129.3	17	451.9	0.1	11.5	0.0	629.8	0.0	0.0	0.0	17.1	6.4	0.0	1.1	0.0	0.2	21.8	688.0
22	1.3	170.2	109	264.7	0.0	11.5	0.0	63.8	0.0	0.0	0.0	10.6	4.3	0.0	2.1	0.0	0.1	18.0	110.4
23	0.9	164.1	40	282.8	0.0	11.5	0.0	90.4	0.0	0.0	0.0	12.3	0.0	0.0	2.5	0.0	0.0	6.7	123.5
24	1.9	148.8	269	329.8	0.0	11.5	0.0	56.1	0.0	0.0	0.0	8.1	0.0	0.0	1.4	0.0	0.0	4.0	81.1
24-Hour Average			445.4	244.5	0.2	11.5	0.9	199.5	0.1	0.1	9.6	13.5	1.2	0.0	1.4	0.8	0.1	5.6	**244.5**
% Contribution			-	-	0.1%	4.7%	0.4%	81.6%	0.0%	0.0%	3.9%	5.5%	0.5%	0.0%	0.6%	0.3%	0.0%	2.3%	100%

Figure 2-2. Modeled vs Monitored Stagnation Day PM_{10} Concentrations ($\mu g/m^3$) at Cowtown (CWT) 10/30/2008 Design Day

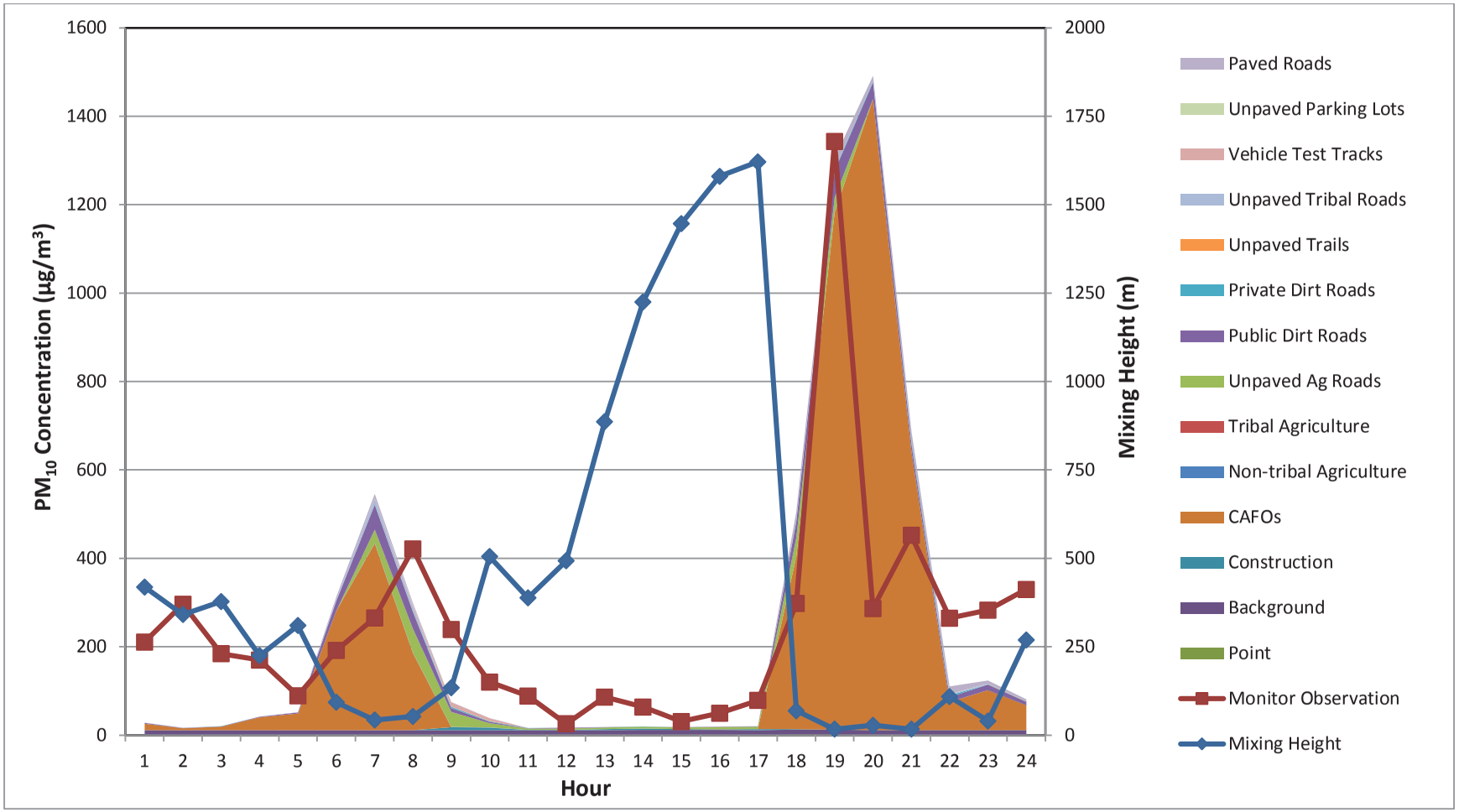


Table 2-9. Stagnation Day Modeling Performance at Pinal County Housing (PCH) on 10/29/2008 Design Day, AERMOD Simulation of Monitored Concentrations (µg/m³)

Hour	Wind Speed (m/s)	Wind Direction (degrees)	Mixing Height (m)	Monitor Observation	Background	Point	Construction	Dairy	Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Unpaved Parking Lots	Paved Roads	Total
1	1.0	100.2	49	91.4	11.5	0.0	0.0	0.0	0.0	0.0	4.1	7.4	0.0	0.4	2.0	25.4
2	0.6	122.1	24	86.1	11.5	0.0	0.0	0.0	0.0	0.0	10.8	12.8	0.0	0.4	1.3	36.9
3	0.5	73.5	19	72.5	11.5	0.0	0.0	0.0	0.0	0.0	30.4	12.5	0.0	0.5	1.2	56.1
4	0.5	144.0	19	67.8	11.5	0.0	0.0	0.0	0.0	0.0	20.3	2.8	0.0	0.3	1.3	36.2
5	0.5	246.0	19	76.6	11.5	0.0	0.0	0.0	0.0	0.0	15.7	20.8	0.0	1.0	2.9	51.9
6	0.5	142.8	19	60.1	11.5	0.0	0.0	0.0	0.0	0.0	13.2	47.4	0.0	1.9	6.7	80.7
7	0.5	189.5	19	145.8	11.5	0.0	0.0	0.0	3.5	0.0	0.0	104.4	18.8	14.2	8.1	160.4
8	0.5	276.0	36	287.0	11.5	0.1	0.0	0.0	28.5	34.6	149.5	115.0	59.7	39.4	4.0	442.4
9	0.7	133.5	146	179.2	11.5	0.2	0.0	0.0	28.7	58.1	132.7	46.2	38.6	24.1	1.2	341.4
10	0.5	300.9	273	455.2	11.5	0.1	0.0	0.0	11.3	45.4	40.8	12.5	6.1	1.7	0.6	130.0
11	0.6	18.9	601	234.8	11.5	0.1	0.0	0.0	5.8	28.3	33.5	7.3	9.1	1.3	0.2	97.2
12	0.7	259.9	956	85.6	11.5	0.0	0.0	0.1	1.9	12.1	7.2	5.0	6.9	0.6	0.3	45.7
13	0.6	308.7	1245	71.4	11.5	0.0	0.0	0.0	1.5	6.4	8.9	5.4	5.6	0.7	0.1	40.1
14	1.2	263.9	1458	62.7	11.5	0.0	0.0	0.0	1.0	4.4	7.0	5.5	5.4	0.7	0.1	35.7
15	1.0	292.9	1613	65.6	11.5	0.0	0.0	0.0	0.8	3.5	7.3	6.2	5.5	0.8	0.0	35.5
16	0.7	244.0	1705	54.5	11.5	0.0	0.0	0.2	0.7	4.2	6.4	6.8	5.3	0.8	0.2	36.1
17	0.7	294.0	1724	40.8	11.5	0.0	0.0	0.2	1.2	6.1	10.4	8.0	8.4	1.0	0.2	47.0
18	0.5	300.1	26	368.4	11.5	0.0	0.0	0.0	36.4	262.6	341.2	177.3	44.8	19.6	0.7	894.2
19	0.5	53.0	19	588.4	11.5	0.0	0.0	0.0	29.9	217.6	450.4	174.3	33.2	17.5	12.5	946.8
20	0.5	57.4	19	453.5	11.5	0.0	0.0	0.0	0.0	0.0	223.8	47.9	0.0	2.3	18.3	303.8
21	0.5	91.7	19	281.6	11.5	0.0	0.0	0.0	0.0	0.0	97.4	44.0	0.0	2.4	13.1	168.4
22	0.5	82.1	19	199.3	11.5	0.0	0.0	0.0	0.0	0.0	67.4	26.9	0.0	1.9	10.3	118.0
23	0.5	128.4	19	128.6	11.5	0.0	0.0	0.0	0.0	0.0	50.0	23.1	0.0	1.0	7.7	93.2
24	0.5	187.8	19	114.4	11.5	0.0	0.0	0.0	0.0	0.0	11.9	20.4	0.0	0.7	4.4	48.9
24-Hour Average			419.4	178.0	11.5	0.0	0.0	0.0	6.3	28.5	72.5	39.2	10.3	5.6	4.1	**178.0**
% Contribution			-	-	6.5%	0.0%	0.0%	0.0%	3.5%	16.0%	40.7%	22.0%	5.8%	3.2%	2.3%	100%

Figure 2-3. Modeled vs Monitored Stagnation Day PM_{10} Concentrations ($\mu g/m^3$) at Pinal County Housing (PCH) 10/29/2008 Design Day

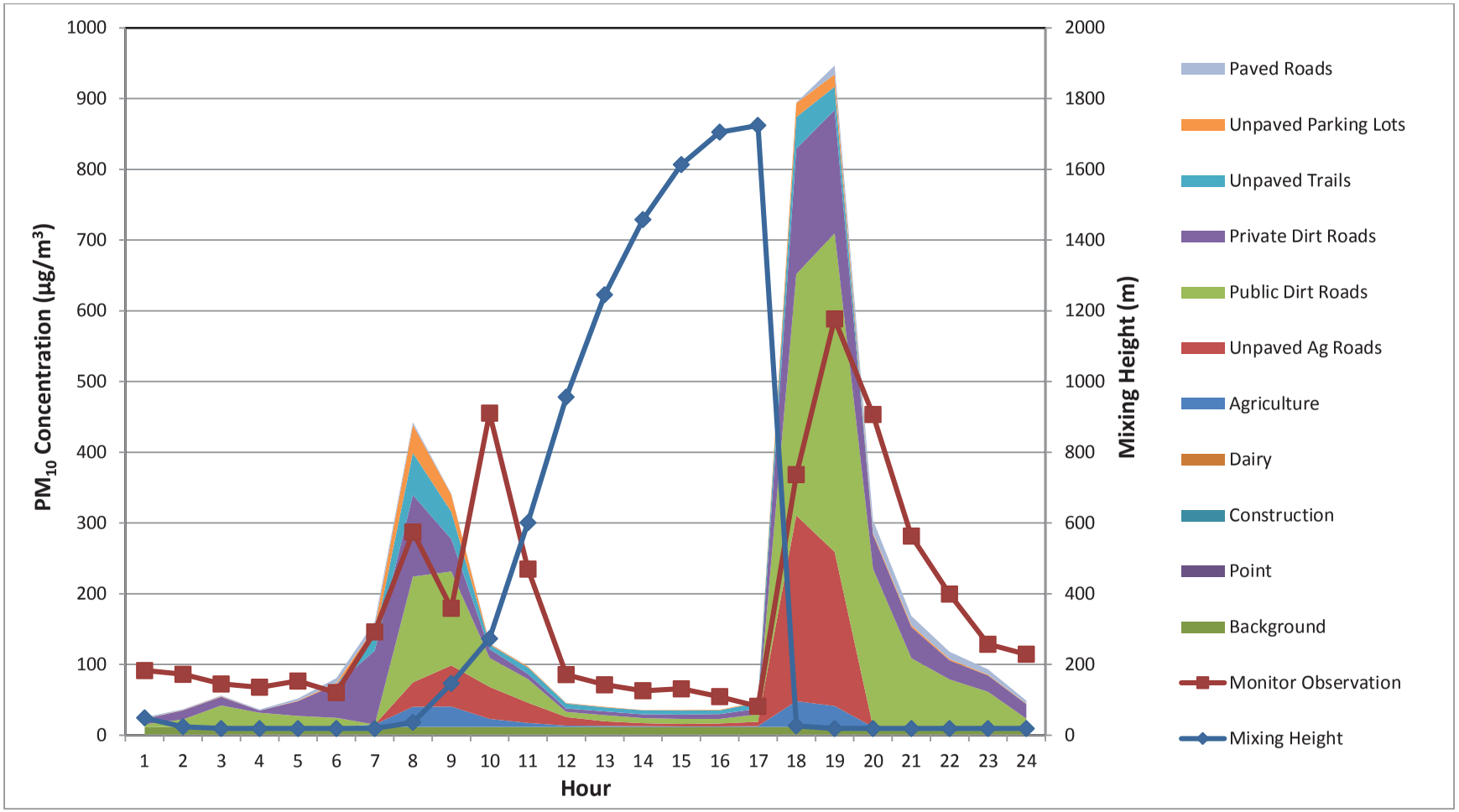


Table 2-10. Stagnation Day Modeling Performance at Stanfield (STF) on 10/29/2008 Design Day, AERMOD Simulation of Monitored Concentrations (µg/m^3)

Hour	Wind Speed (m/s)	Wind Direction (degrees)	Mixing Height (m)	Monitor Observation	Background	Construction	CAFOs	Dairy	Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Unpaved Parking Lots	Paved Roads	Total
1	1.0	251.9	27	46.0	11.5	0.0	0.0	0.0	0.0	0.0	7.7	4.2	0.0	0.2	4.0	27.6
2	1.0	159.9	31	79.0	11.5	0.0	0.0	0.0	0.0	0.0	7.7	18.2	0.0	0.5	3.2	41.1
3	1.6	139.5	57	76.8	11.5	0.0	0.0	0.0	0.0	0.0	8.3	20.3	0.0	0.6	0.6	41.3
4	1.3	155.2	42	63.0	11.5	0.0	0.0	0.0	0.0	0.0	6.6	5.0	0.0	0.2	0.6	23.9
5	1.2	99.4	41	144.0	11.5	0.0	168.8	0.0	0.0	0.0	15.4	7.7	0.0	0.3	4.1	207.8
6	0.9	108.0	24	183.5	11.5	0.0	253.3	0.0	0.0	0.0	98.5	46.8	0.0	1.1	13.3	424.5
7	0.8	179.6	21	187.7	11.5	0.0	92.6	0.0	26.1	158.7	115.3	105.6	1.0	19.0	15.0	544.8
8	0.8	171.9	21	307.2	11.5	0.0	0.0	0.0	51.8	297.2	94.5	104.8	2.4	34.7	13.2	610.1
9	0.7	183.8	98	226.0	11.5	1.8	0.0	0.0	34.3	243.3	78.8	48.1	1.9	19.5	8.3	447.5
10	1.6	82.4	266	133.2	11.5	1.5	3.8	0.0	9.8	105.0	29.5	13.5	2.6	4.5	1.7	183.4
11	1.4	121.4	539	126.2	11.5	0.0	4.5	0.0	4.4	32.1	14.1	7.6	2.0	3.0	0.4	79.6
12	1.3	129.8	888	116.1	11.5	0.0	1.3	0.0	4.0	26.9	15.0	8.8	0.3	2.7	0.4	70.9
13	1.3	165.8	1177	101.7	11.5	0.4	0.2	0.0	2.4	14.1	8.0	9.0	0.2	2.5	0.4	48.7
14	0.9	112.1	1387	69.7	11.5	0.3	1.7	0.0	1.8	12.7	7.3	9.2	0.9	2.6	0.5	48.5
15	1.0	67.2	1541	65.5	11.5	0.0	1.7	0.0	1.7	15.1	8.8	6.3	2.5	2.8	0.4	50.8
16	1.1	94.3	1632	43.8	11.5	0.0	2.3	0.0	1.4	13.6	8.7	5.8	3.0	3.0	0.6	49.9
17	1.3	59.4	1652	43.8	11.5	0.0	1.8	0.0	1.5	16.2	6.9	4.2	5.1	3.7	0.6	51.5
18	1.2	5.3	45	509.1	11.5	0.0	0.0	0.0	7.0	278.8	3.6	6.0	8.5	11.3	0.4	327.1
19	1.1	297.8	35	341.7	11.5	0.0	0.0	0.0	5.3	227.1	1.3	35.9	4.5	8.4	2.1	296.1
20	0.8	296.4	21	628.5	11.5	0.0	0.0	0.0	0.0	0.0	0.0	53.5	0.0	0.7	3.0	68.7
21	1.3	260.5	44	124.8	11.5	0.0	0.1	0.0	0.0	0.0	8.0	37.7	0.0	0.7	17.2	75.2
22	1.0	253.8	28	72.7	11.5	0.0	0.1	0.0	0.0	0.0	13.0	17.7	0.0	0.5	28.4	71.2
23	1.3	169.3	43	93.1	11.5	0.0	0.0	0.0	0.0	0.0	14.9	14.8	0.0	0.6	14.0	55.8
24	1.6	163.9	58	106.6	11.5	0.0	0.0	0.0	0.0	0.0	15.7	12.2	0.0	0.6	1.9	41.9
24-Hour Average			405	162.1	11.5	0.2	22.2	0.0	6.3	60.0	24.5	25.1	1.5	5.2	5.6	162.0
% Contribution			-	-	7.1%	0.1%	13.7%	0.0%	3.9%	37.1%	15.1%	15.5%	0.9%	3.2%	3.5%	100%

Figure 2-4. Modeled vs Monitored Stagnation Day PM_{10} Concentrations ($\mu g/m^3$) at Stanfield (STF) 10/29/2008 Design Day

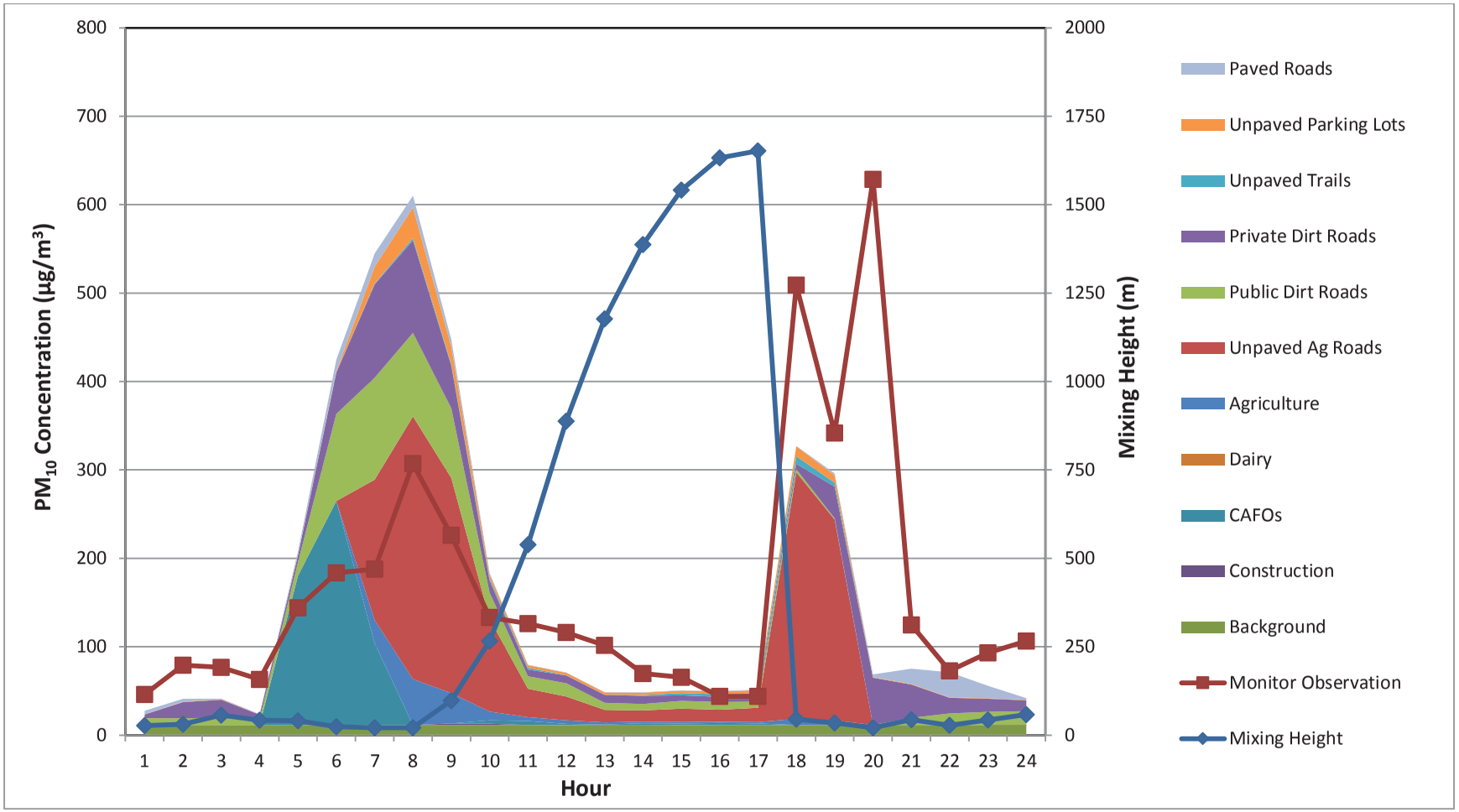


Figure 2-5. 2008 Stagnation Design Days Source Contributions

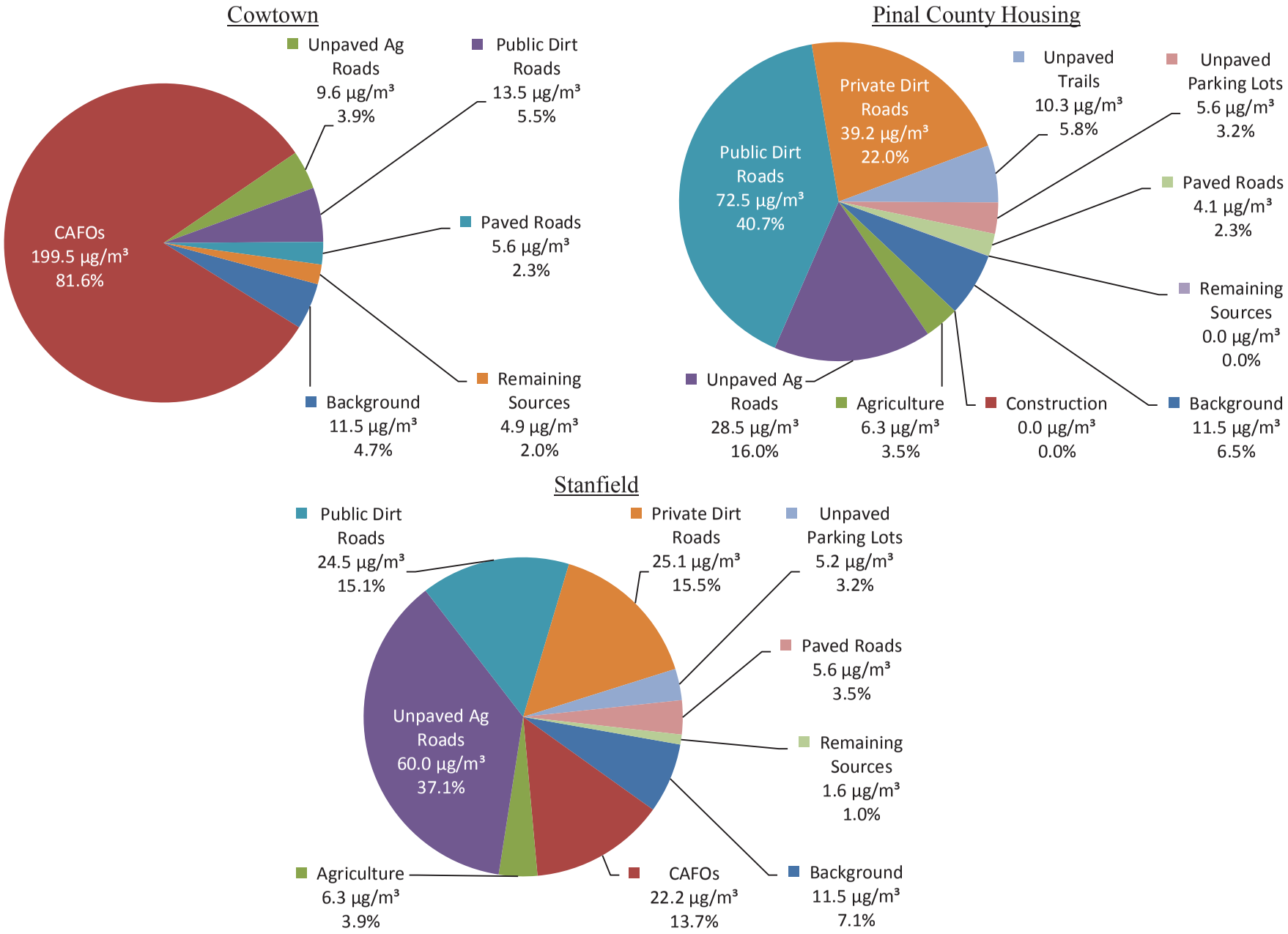


Table 2-11. Projected 2018 Stagnation Day Modeling Performance at Cowtown (CWT) on 10/30/2008, AERMOD Simulation of Monitored Concentrations (µg/m^3)

Hour	Wind Speed (m/s)	Wind Direction (degrees)	Mixing Height (m)	2008 Monitor Observation	Point	Background	Construction	CAFOs	Non-tribal Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Unpaved Tribal Roads	Vehicle Test Tracks	Unpaved Parking Lots	Paved Roads	Total
1	2.4	139.7	419	210.7	0.0	11.5	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.2	0.0	0.0	1.3	14.9
2	2.2	140.2	341	296.4	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.2	0.0	0.0	0.6	13.0
3	2.3	155.5	378	184.2	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	0.2	0.0	0.0	0.5	13.1
4	1.8	154.4	225	169.9	0.0	11.5	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.2	0.0	0.0	0.7	14.0
5	2.1	135.6	310	89.1	0.0	11.5	0.0	0.0	0.0	0.0	0.0	2.3	0.1	0.0	0.2	0.0	0.0	1.3	15.5
6	1.1	148.6	93	191.5	0.0	11.5	0.0	0.0	0.0	0.0	0.0	26.4	0.7	0.0	2.6	0.0	0.1	10.0	51.2
7	1.0	158.3	43	265.2	0.0	11.5	0.0	0.0	0.0	1.0	30.0	65.9	0.6	0.0	15.0	0.0	0.7	16.0	140.7
8	0.4	58.8	53	421.2	0.0	11.5	0.0	0.0	0.3	0.9	54.1	44.6	1.7	0.1	10.8	3.5	0.7	7.2	135.4
9	0.5	33.7	134	239.1	0.1	11.5	19.6	0.0	0.6	0.0	34.1	9.9	3.1	0.2	0.0	10.5	0.1	0.8	90.6
10	2.4	98.6	505	120.2	0.0	11.5	16.6	0.0	0.5	0.0	9.7	3.8	1.5	0.1	0.0	6.3	0.0	0.5	50.4
11	1.9	112.3	388	88.7	0.1	11.5	0.2	0.0	0.2	0.0	2.9	1.3	0.4	0.0	0.0	0.0	0.0	0.1	16.6
12	1.6	83.4	493	25.9	0.1	11.5	0.1	0.0	0.1	0.0	3.1	1.9	0.5	0.0	0.1	0.0	0.0	0.1	17.6
13	1.5	325.6	886	86.2	0.1	11.5	1.3	0.0	0.1	0.0	3.5	1.0	0.4	0.0	0.1	0.0	0.0	0.2	18.1
14	1.6	320.7	1225	63.8	0.5	11.5	1.8	0.1	0.0	0.0	4.1	0.3	0.3	0.0	0.0	0.0	0.0	0.5	19.2
15	1.4	335.4	1446	30.8	0.7	11.5	0.9	0.1	0.0	0.0	3.8	0.3	0.3	0.0	0.0	0.0	0.0	0.5	18.0
16	1.1	325.9	1580	49.8	0.3	11.5	0.9	0.3	0.0	0.0	4.8	0.6	0.3	0.0	0.0	0.0	0.0	0.7	19.5
17	1.4	326.7	1621	78.5	0.0	11.5	1.3	0.3	0.0	0.0	5.3	0.6	0.3	0.0	0.0	0.0	0.0	0.7	20.0
18	0.8	290.4	69	298.2	1.3	11.5	0.5	213.0	0.1	0.0	42.2	42.9	2.2	0.0	0.0	0.0	0.2	33.2	347.1
19	0.5	252.5	17	1342.7	1.2	11.5	0.0	1015.8	0.1	0.0	33.6	70.7	3.6	0.0	0.1	0.0	0.3	42.3	1179.1
20	0.8	249.1	28	286.5	0.1	11.5	0.0	1427.2	0.0	0.0	0.0	43.9	3.5	0.0	0.2	0.0	0.1	20.6	1507.1
21	0.5	129.3	17	451.9	0.1	11.5	0.0	613.0	0.0	0.0	0.0	20.0	7.5	0.0	1.3	0.0	0.2	36.1	689.7
22	1.3	170.2	109	264.7	0.0	11.5	0.0	0.0	0.0	0.0	0.0	12.4	5.0	0.0	2.5	0.0	0.1	29.7	61.2
23	0.9	164.1	40	282.8	0.0	11.5	0.0	0.0	0.0	0.0	0.0	14.4	0.0	0.0	2.9	0.0	0.0	11.1	40.0
24	1.9	148.8	269	329.8	0.0	11.5	0.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	1.6	0.0	0.0	6.7	29.3
24-Hour Average			445.4	244.5	0.2	11.5	1.8	136.2	0.1	0.1	9.6	15.7	1.3	0.0	1.6	0.8	0.1	9.2	**188.4**
% Contribution			-	-	0.1%	6.1%	1.0%	72.3%	0.0%	0.0%	5.1%	8.3%	0.7%	0.0%	0.8%	0.4%	0.1%	4.9%	100%

Figure 2-6. 2018 Modeled vs. 2008 Monitored Stagnation Day Concentrations (µg/m³) at Cowtown (CWT) 10/30/2008 Design Day

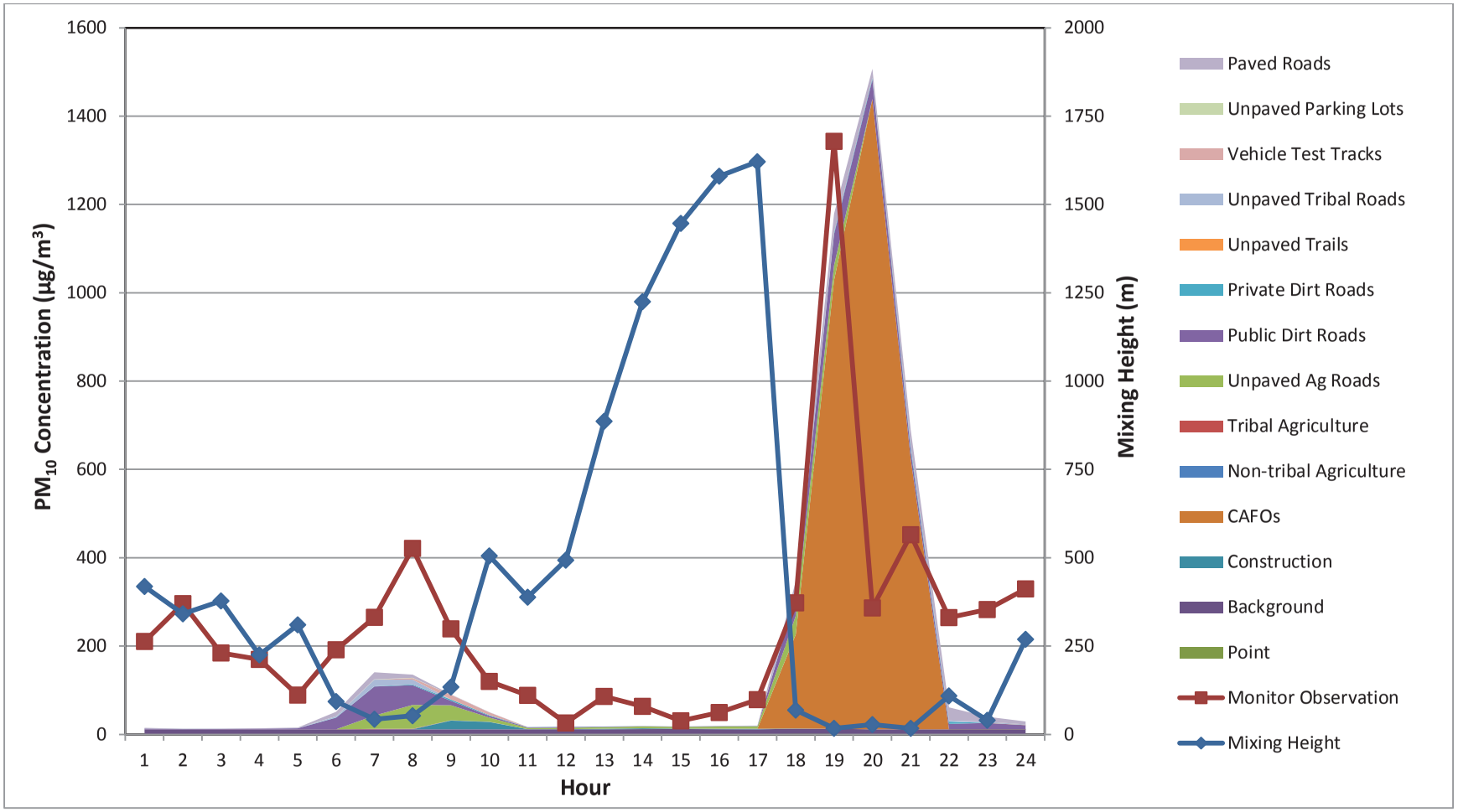


Table 2-12. Projected 2018 Stagnation Day Modeling Performance at Pinal County Housing (PCH) on 10/29/2008, AERMOD Simulation of Monitored Concentrations (µg/m^3)

Hour	Wind Speed (m/s)	Wind Direction (degrees)	Mixing Height (m)	2008 Monitor Observation	Background	Point	Construction	Dairy	Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Unpaved Parking Lots	Paved Roads	Total
1	1.0	100.2	49	91.4	11.5	0.0	0.0	0.0	0.0	0.0	4.8	8.6	0.0	0.4	2.9	28.1
2	0.6	122.1	24	86.1	11.5	0.0	0.0	0.0	0.0	0.0	12.6	14.9	0.0	0.4	1.8	41.2
3	0.5	73.5	19	72.5	11.5	0.0	0.0	0.0	0.0	0.0	13.2	14.5	0.0	0.5	1.6	41.4
4	0.5	144.0	19	67.8	11.5	0.0	0.0	0.0	0.0	0.0	5.0	3.3	0.0	0.3	1.8	21.9
5	0.5	246.0	19	76.6	11.5	0.0	0.0	0.0	0.0	0.0	3.4	24.2	0.0	1.0	4.0	44.2
6	0.5	142.8	19	60.1	11.5	0.0	0.0	0.0	0.0	0.0	2.9	55.2	0.0	1.9	9.2	80.7
7	0.5	189.5	19	145.8	11.5	0.0	0.0	0.0	3.5	0.0	0.0	121.6	18.8	14.2	11.0	180.6
8	0.5	276.0	36	287.0	11.5	0.1	430.2	0.0	28.5	34.6	7.2	127.8	59.7	39.4	4.9	744.0
9	0.7	133.5	146	179.2	11.5	0.2	362.8	0.0	28.7	58.1	14.4	48.5	38.6	24.1	1.2	588.2
10	0.5	300.9	273	455.2	11.5	0.1	6.3	0.0	11.3	45.4	28.8	14.6	6.1	1.7	0.8	126.5
11	0.6	18.9	601	234.8	11.5	0.1	4.3	0.0	5.8	28.3	18.4	8.5	9.1	1.3	0.3	87.6
12	0.7	259.9	956	85.6	11.5	0.0	10.2	0.1	1.9	12.1	0.6	5.8	6.9	0.6	0.4	50.0
13	0.6	308.7	1245	71.4	11.5	0.0	10.0	0.0	1.5	6.4	2.9	6.3	5.6	0.7	0.2	44.9
14	1.2	263.9	1458	62.7	11.5	0.0	6.9	0.0	1.0	4.4	2.3	6.4	5.4	0.7	0.1	38.7
15	1.0	292.9	1613	65.6	11.5	0.0	7.1	0.0	0.8	3.5	1.6	7.1	5.5	0.8	0.1	38.0
16	0.7	244.0	1705	54.5	11.5	0.0	7.9	0.2	0.7	4.2	1.4	7.9	5.3	0.8	0.3	40.2
17	0.7	294.0	1724	40.8	11.5	0.0	8.8	0.2	1.2	6.1	3.1	9.3	8.4	1.0	0.3	49.8
18	0.5	300.1	26	368.4	11.5	0.0	3.2	0.0	36.4	262.6	162.6	207.2	44.8	19.6	0.9	748.8
19	0.5	53.0	19	588.4	11.5	0.0	0.0	0.0	29.9	217.6	191.8	203.7	33.2	17.5	17.0	722.1
20	0.5	57.4	19	453.5	11.5	0.0	0.0	0.0	0.0	0.0	83.1	56.2	0.0	2.3	24.8	177.8
21	0.5	91.7	19	281.6	11.5	0.0	0.0	0.0	0.0	0.0	63.6	51.6	0.0	2.4	17.8	146.9
22	0.5	82.1	19	199.3	11.5	0.0	0.0	0.0	0.0	0.0	60.4	31.6	0.0	1.9	13.9	119.3
23	0.5	128.4	19	128.6	11.5	0.0	0.0	0.0	0.0	0.0	43.0	26.9	0.0	1.0	10.4	92.8
24	0.5	187.8	19	114.4	11.5	0.0	0.0	0.0	0.0	0.0	13.8	23.8	0.0	0.7	6.0	55.9
24-Hour Average			419.4	178.0	11.5	0.0	35.7	0.0	6.3	28.5	30.9	45.2	10.3	5.6	5.5	**179.6**
% Contribution			-	-	6.4%	0.0%	19.9%	0.0%	3.5%	15.9%	17.2%	25.2%	5.7%	3.1%	3.0%	100%

Figure 2-7. 2018 Modeled vs. 2008 Monitored Stagnation Day Concentrations (µg/m³) at Pinal County Housing (PCH) 10/29/2008 Design Day

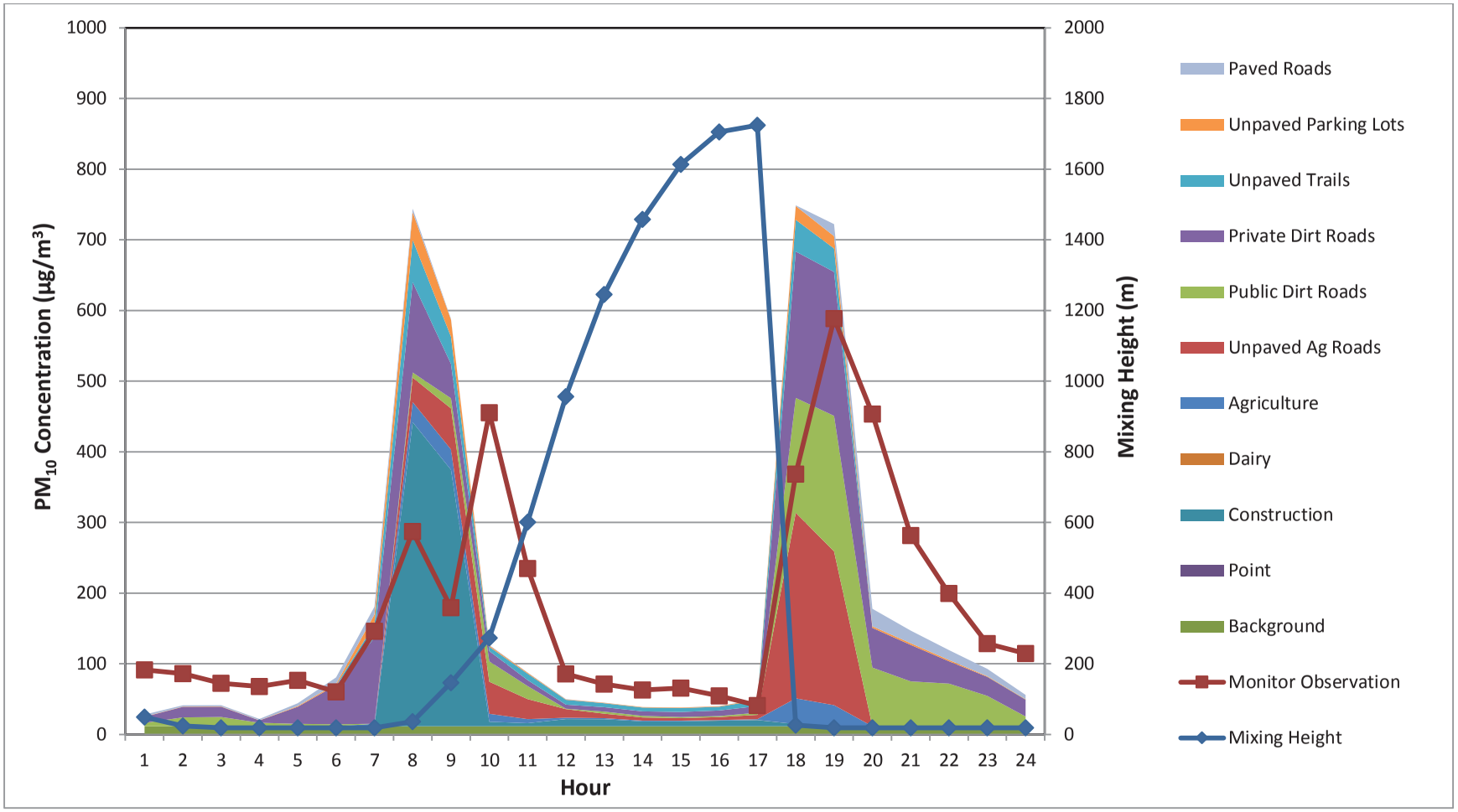


Table 2-13. Projected 2018 Stagnation Day Modeling Performance at Stanfield (STF) on 10/29/2008, AERMOD Simulation of Monitored Concentrations (µg/m^3)

Hour	Wind Speed (m/s)	Wind Direction (degrees)	Mixing Height (m)	2008 Monitor Observation	Background	Construction	CAFOs	Dairy	Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Unpaved Parking Lots	Paved Roads	Total
1	1.0	251.9	27	46.0	11.5	0.0	0.0	0.0	0.0	0.0	9.0	4.9	0.0	0.2	5.9	31.5
2	1.0	159.9	31	79.0	11.5	0.0	0.0	0.0	0.0	0.0	9.0	21.3	0.0	0.5	4.8	47.1
3	1.6	139.5	57	76.8	11.5	0.0	0.0	0.0	0.0	0.0	9.7	23.7	0.0	0.6	0.8	46.3
4	1.3	155.2	42	63.0	11.5	0.0	0.0	0.0	0.0	0.0	7.7	5.8	0.0	0.2	0.8	26.0
5	1.2	99.4	41	144.0	11.5	0.0	370.9	0.0	0.0	0.0	18.0	9.0	0.0	0.3	2.4	412.1
6	0.9	108.0	24	183.5	11.5	0.0	556.4	0.0	0.0	0.0	115.2	54.5	0.0	1.1	8.1	746.8
7	0.8	179.6	21	187.7	11.5	0.0	203.4	0.0	26.1	158.7	134.7	123.1	1.0	19.0	13.8	691.3
8	0.8	171.9	21	307.2	11.5	0.0	0.0	0.0	51.8	297.2	110.3	122.2	2.4	34.7	17.0	647.1
9	0.7	183.8	98	226.0	11.5	1.2	0.0	0.0	34.3	243.3	92.0	56.1	1.9	19.5	10.6	470.4
10	1.6	82.4	266	133.2	11.5	1.9	0.7	0.0	9.8	105.0	34.4	15.8	2.6	4.5	2.1	188.3
11	1.4	121.4	539	126.2	11.5	1.4	3.1	0.0	4.4	32.1	16.5	8.9	2.0	3.0	0.4	83.3
12	1.3	129.8	888	116.1	11.5	1.0	2.8	0.0	4.0	26.9	17.6	10.3	0.3	2.7	0.5	77.6
13	1.3	165.8	1177	101.7	11.5	0.6	0.5	0.0	2.4	14.1	9.4	10.5	0.2	2.5	0.5	52.2
14	0.9	112.1	1387	69.7	11.5	0.6	3.6	0.0	1.8	12.7	8.5	10.7	0.9	2.6	0.5	53.4
15	1.0	67.2	1541	65.5	11.5	0.6	3.5	0.0	1.7	15.1	10.3	7.4	2.5	2.8	0.4	55.8
16	1.1	94.3	1632	43.8	11.5	0.5	4.3	0.0	1.4	13.6	10.1	6.7	3.0	3.0	0.7	54.8
17	1.3	59.4	1652	43.8	11.5	0.4	3.5	0.0	1.5	16.2	8.0	4.9	5.1	3.7	0.8	55.6
18	1.2	5.3	45	509.1	11.5	0.2	0.0	0.0	7.0	278.8	4.2	7.1	8.5	11.3	0.2	328.8
19	1.1	297.8	35	341.7	11.5	0.0	0.0	0.0	5.3	227.1	1.5	41.9	4.5	8.4	2.7	302.9
20	0.8	296.4	21	628.5	11.5	0.0	0.0	0.0	0.0	0.0	0.0	62.3	0.0	0.7	4.3	78.8
21	1.3	260.5	44	124.8	11.5	0.0	0.1	0.0	0.0	0.0	9.3	43.9	0.0	0.7	25.0	90.5
22	1.0	253.8	28	72.7	11.5	0.0	0.1	0.0	0.0	0.0	15.1	20.7	0.0	0.5	41.7	89.6
23	1.3	169.3	43	93.1	11.5	0.0	0.0	0.0	0.0	0.0	17.4	17.2	0.0	0.6	20.6	67.3
24	1.6	163.9	58	106.6	11.5	0.0	0.0	0.0	0.0	0.0	18.3	14.2	0.0	0.6	2.7	47.3
24-Hour Average			404.9	162.1	11.5	0.4	48.0	0.0	6.3	60.0	28.6	29.3	1.5	5.2	7.0	**197.7**
% Contribution			-	-	5.8%	0.2%	24.3%	0.0%	3.2%	30.4%	14.5%	14.8%	0.7%	2.6%	3.5%	100%

Figure 2-8. 2018 Modeled vs. 2008 Monitored Stagnation Day Concentrations (µg/m³) at Stanfield (STF) 10/29/2008 Design Day

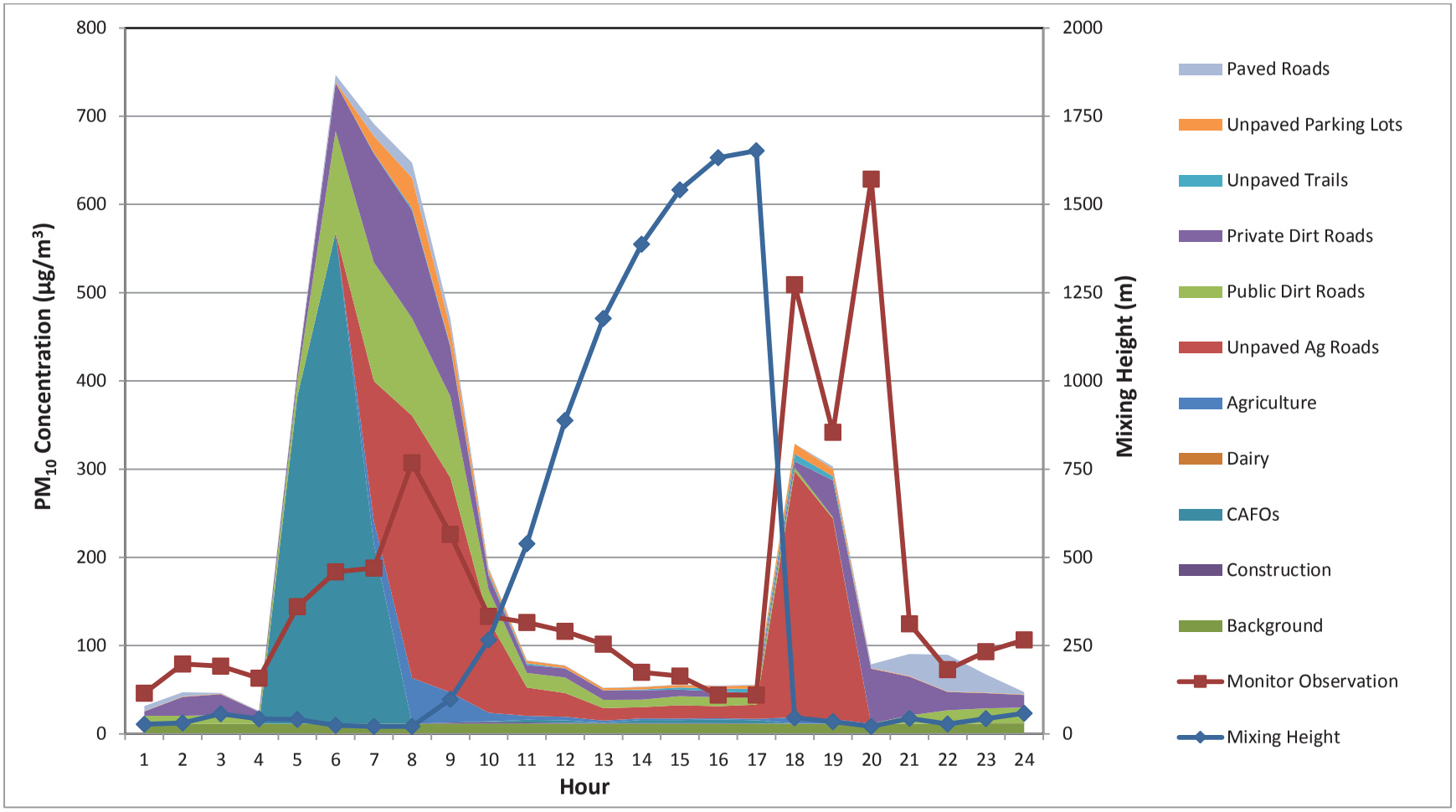
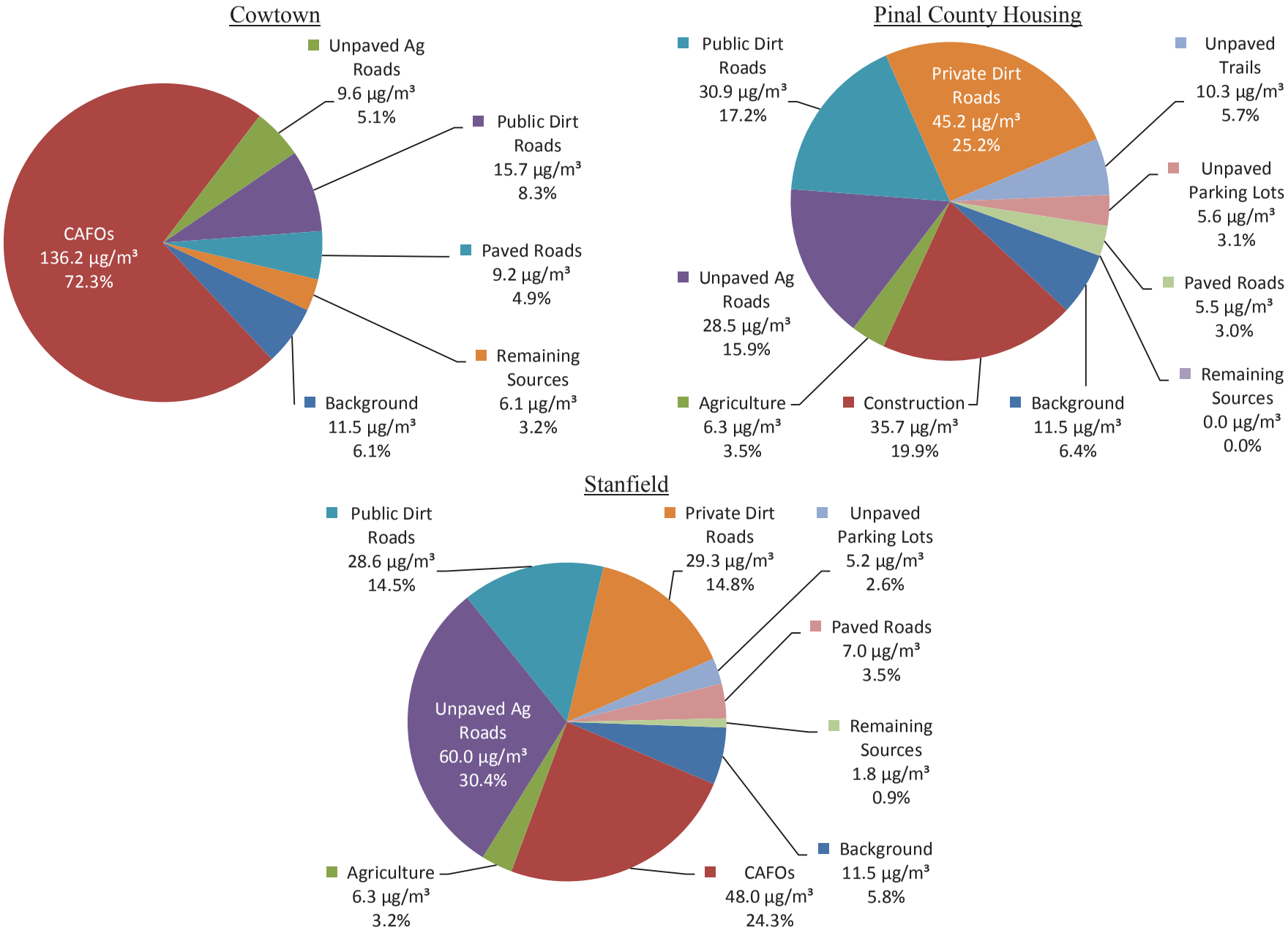


Figure 2-9. Projected 2018 Stagnation Design Day Source Contributions



3. HIGH WIND DAY MODELING

High wind design days selected for Pinal County PM_{10} monitoring sites included both high wind hours (when hourly average wind speeds exceeded 12 mph) and low wind hours. During high wind hours, windblown PM_{10} emissions are generally much greater than those generated by mechanical sources. However, as discussed in the emission inventory report, emissions from sources of mechanically generated PM_{10} were included in the modeling of windblown PM_{10} emissions in order to fully account for all source contributions during high wind hours. For low wind hours, it was assumed that all PM_{10} emissions are generated by mechanical sources and none are produced by wind entrainment. The remainder of this section describes how high wind hour emissions were treated and how the benefits from high wind control measures were evaluated.

3.1 Methodology

The method used to assess high wind hour source apportionment and to provide a basis for demonstrating attainment is the weighted rollback method, a demonstration approach that was employed in MAG's Five Percent Plan[23] and approved by EPA. As discussed in the Five Percent Plan:

> *The fundamental assumption underlying any rollback method is that pollutant concentrations are directly proportional to total emissions over the area of interest. A weighted rollback approach applies a distance reduction factor to the emissions of each source in the modeling domain to help assess the impact of emissions as distance from the monitor increases. The reduction factor is calculated based upon the distance between each source and the impacting monitor.*

The concept for this approach came from a saturation monitoring study in which Maricopa County placed a string of temporary PM_{10} continuous monitors along the Salt River channel west of the permanent monitors in the Salt River industrial zone (i.e., West 43rd Avenue and Durango Complex stations). Data were collected for an extended period, and differences between sequential monitored concentrations were calculated during high wind hours when winds generally followed a path parallel to the line connecting the temporary and permanent monitors. The results of that analysis and the AERMOD analysis of alternate weighting factors determined that distance weighting (1/distance, where distance is measured from the centroid of the source to the monitor) was an appropriate mechanism to evaluate the impacts of PM_{10} emissions from individual land parcels within back-

[23] Section 6, Attainment Demonstration, "MAG 2012 Five Percent Plan for PM-10 for Maricopa County Nonattainment Area," Maricopa Association of Governments, May 2012.

trajectory modeling domains. MAG used this approach to evaluate all high wind hour emission estimates.

Because Maricopa County had not experienced a low wind violation of the PM_{10} standard since 2007, the Five Percent Plan focused on modeling windblown fugitive dust produced during high wind hours. This resulted in the distance-weighted modeling approach cited above to assess impacts at monitors. Low wind monitor impacts were not modeled; instead, emission inventory estimates for the low wind domains were simply quantified[24] to represent the basis for low wind hour concentrations.

In contrast to Maricopa County, Pinal County experienced violations under both stagnation and high wind conditions. A review of low wind hour concentrations on high wind design days found that some low wind hour concentrations exceeded high wind hour concentrations. Based on this finding, decisions were made (1) to model the effect of low wind hour mechanically generated emissions and (2) to model both mechanically generated emissions and windblown dust emissions during high wind hours.

As noted in the accompanying base year emission inventory document, mechanically driven emissions were quantified for the low wind domains at each monitor for each hour of the high wind design days. Because the areal extent of these domains encompassed the high wind domains, mechanically driven emissions for sources located within the high wind domains were extracted from the low wind domains for the high wind hours using 45º arcs centered on and opening in the direction opposite to the vector-average wind direction for each high wind hour. The rationale supporting this choice was that the areal extent of the low wind domains should approximate the modeling domains used for high winds. A similar approach was adopted to define the areal boundaries of low wind hour domains to be modeled.[25] Parcel-specific emissions within the low wind and high wind domains were weighted in proportion to their distance from the monitor. This approach ensured that both high and low wind hourly emissions were weighted in the same manner so as to be additive and facilitate control strategy benefit analysis.

3.2 Non-Anthropogenic Background

Evaluations of meteorological conditions on high wind design days revealed that winds capable of entraining surface soil particles (i.e., having hourly average speeds ≥ 12 mph) were consistently from the northeast direction during high wind hours. One of the closest PM_{10} monitors outside the boundary of the Western Pinal County nonattainment area and generally upwind in a northeasterly direction from the four high wind exceedance monitors is a station located in the small community of Queen Valley. The community of Queen Valley was recorded in the 2010 Census as having a permanent population of 788. The permanent population is augmented in winter by seasonal residents drawn by the relatively moderate climate. Land use in the area is predominately residential, light commercial use,

[24] Page V-75, "Technical Document in Support of the MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area," Maricopa Association of Governments, May 2012.
[25] Boundaries for both low and high wind hour domains on high wind days are displayed in Section 2 of Appendix B of this SIP submittal, "Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days," ibid.

and recreation (e.g., the nearby golf course). The topography of the area is generally hilly or mountainous, with the Queen Creek wash running east to west through the community. PM_{10} source emissions near the site are low and limited to contributions from vehicular traffic and residential and commercial activities. In general, roadways in Queen Valley are paved, with the exception of roads outside the populated area. The Queen Valley site was selected to represent PM_{10} concentrations near the upwind boundary of the nonattainment area during high wind hours.

Because the Queen Valley PM_{10} monitoring period included days during which no high wind hours were recorded, available 24-hour average PM_{10} concentrations were screened to identify the subset of high wind days. Because the Queen Valley site does not record meteorological conditions, meteorological data were obtained from a monitoring station located in Superior, Arizona, approximately 12 miles to the east. The Queen Valley data were screened to eliminate days with fewer than 6 hours of high winds (> 12 mph), to be consistent with the criteria used to define days eligible for high wind design day designation, and days when high winds were predominantly from directions other than the northeast. This produced a 6-day data set, with an average concentration of 17.5 $\mu g/m^3$. An analysis of high wind days at Organ Pipe Cactus National Monument, the background site used in the MAG Five Percent Plan, produced a 5-day data set with an average concentration of 18.5 $\mu g/m^3$, demonstrating that the Queen Valley high wind day concentrations were in the same range as those collected at Organ Pipe, a rural site with almost no anthropogenic activity or disturbance nearby. The 6-day average of 17.5 $\mu g/m^3$ recorded at Queen Valley was selected to represent the background PM_{10} level in high wind rollback calculations.

3.3 Results

A summary of the source contributions to overall weighted emissions is presented by hour for each monitor and design day in Tables 3-1 through 3-4 (2008 base year) and Tables 3-5 through 3-8 (the projected year of 2018) for Pinal County Housing, Cowtown, Maricopa, and Stanfield monitoring sites, respectively. Also presented is information on hourly wind speed, wind direction, and monitored concentration. While these variables employ different units (degrees, miles/hour, $\mu g/m^3$, etc.), insight into source apportionment can be gained by contrasting the modeled diurnal profiles of individual source categories and the monitored diurnal profiles of the four sites on designated high wind design days. Visual displays of the source-specific hourly weighted emission estimates and monitored concentrations are displayed in Figures 3-1 through 3-4 (2008 base year) and Figures 3-6 through 3-9 (the projected year of 2018). Figure 3-5 (2008 base year) and Figure 3-10 (the projected year of 2018) summarize the average daily source-specific contributions for each site.

The methodology for computing high wind emission factors is presented in Appendix B of this SIP submittal.[26] Independent of the relationships developed between windblown PM_{10} emission factors and hourly-average wind speed, the analysis of emission factors in the accompanying document includes discussions of particle saltation initiation times and soil

[26] "Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days," ibid.

reservoir depletion that also play a role in the diurnal profile of windblown PM_{10} emissions on high wind days.

High wind days are comprised of activity-based emissions (occurring during low and high wind hours) and windblown emissions (occurring during high wind hours). Changes in the low wind hour emissions estimates between 2008 and 2018 are similar to those described in Section 2. High wind hour windblown emission estimates are projected to remain the same between 2008 and 2018 except for a few land use categories:

- Windblown dust emissions from construction are projected to decline by 36% as the number of dust permits decreases from 2008 to 2018.[27]

- To account for the completion of construction projects, some Construction land use area was reclassified as Developed Urban Lands. As a result, the Developed Urban Lands windblown dust total grew by 24% from 2008 to 2018.

- Similarly, as a result of road improvement construction projects being completed, Unpaved Road windblown dust emissions were slightly lower in 2018 than in 2008.

- CAFOs which stopped operating between 2008 and 2018 were reclassified as Cleared Areas. Subsequently, windblown dust emissions from CAFOs dropped by 43%, while emissions from Cleared Areas increased by 15%.

The resulting changes in high wind modeling impacts from 2008 to 2018 are generally small, except for the Maricopa site, where construction is one of the dominant source categories.

[27] The detailed construction emission projections from 2008 to 2018 are described in Section 3.2.2 of the emission inventory document, "Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days," ibid.

Table 3-1. Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at Pinal County Housing (PCH) on 1/1/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	Monitor Obser-vation	Paved Road	Point Sources	Con-struction	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agri-culture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Total
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.2	0.0	2.6
2	1.5	318.0	21.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	0.0	3.6
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	0.0	2.4
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.5
5	5.9	352.2	16.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.2	0.0	2.8
6	3.1	299.6	19.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	13.0	2.7	0.0	15.9
7	3.9	339.3	16.2	0.1	0.0	0.0	1.6	0.0	0.0	0.0	0.0	12.8	46.2	13.1	10.2	0.9	85.0
8	5.7	5.0	22.7	1.3	0.0	0.0	0.9	0.0	0.0	0.0	0.0	14.1	61.2	13.2	5.2	0.1	96.0
9	4.8	53.9	34.7	0.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	15.2	60.8	22.2	9.8	0.4	109.6
10	16.2	41.2	871.2	0.6	0.0	0.0	0.7	16.2	60.2	29.1	2.5	473.1	96.9	33.8	31.2	6.3	750.7
11	21.3	46.3	919.3	0.6	0.0	0.0	0.5	67.0	238.9	115.6	11.0	2050.3	231.1	65.9	57.5	26.5	2865.0
12	24.9	49.6	1136.1	0.4	0.0	0.0	0.6	221.0	787.7	381.0	36.2	6735.9	621.1	191.0	163.3	86.5	9224.7
13	23.4	48.5	790.7	0.4	0.0	0.0	0.5	91.3	325.4	157.4	15.0	2790.1	291.0	91.0	74.8	36.0	3873.0
14	22.8	48.3	946.1	0.4	0.0	0.0	0.6	48.5	172.8	83.6	8.0	1487.8	182.8	61.7	56.7	19.3	2122.3
15	19.1	47.6	320.0	0.5	0.0	0.0	0.5	23.7	87.9	42.5	3.6	686.7	115.2	45.2	34.5	9.0	1049.3
16	22.1	53.6	397.9	0.8	0.0	0.0	0.5	45.3	161.7	78.2	7.4	1394.8	176.6	64.8	47.7	18.1	1995.9
17	19.8	53.6	281.9	0.8	0.0	0.0	0.5	26.4	98.0	47.4	4.0	768.7	123.6	48.0	29.2	10.0	1156.7
18	15.0	50.6	65.8	0.7	0.0	0.0	0.6	7.3	28.1	13.6	1.0	207.5	76.4	30.8	16.3	2.8	385.1
19	15.5	54.6	50.9	0.8	0.0	0.0	0.1	4.1	15.2	7.3	0.6	116.6	9.7	17.5	14.3	1.5	187.6
20	19.2	58.1	61.5	0.6	0.0	0.0	0.1	10.0	37.2	18.0	1.5	285.8	23.8	15.7	14.9	3.6	411.2
21	19.2	56.7	70.6	0.4	0.0	0.0	0.1	9.1	33.8	16.4	1.4	259.8	21.7	15.6	15.7	3.3	377.2
22	19.0	57.4	67.6	0.4	0.0	0.0	0.0	7.3	27.0	13.1	1.1	207.8	17.3	12.8	7.2	2.6	296.7
23	17.1	55.7	32.7	0.2	0.0	0.0	0.0	3.5	12.8	6.2	0.5	98.7	8.2	7.5	4.6	1.3	143.7
24	14.8	54.6	139.3	0.1	0.0	0.0	0.0	3.4	13.0	6.3	0.5	89.3	7.4	5.6	2.7	1.1	129.3
24-Hour Average			264.9	0.4	0.0	0.0	0.4	24.3	87.5	42.3	3.9	737.3	90.5	32.4	25.1	9.6	1053.7
% Contribution [a]			-	0.0%	0.0%	0.0%	0.0%	2.3%	8.3%	4.0%	0.4%	70.0%	8.6%	3.1%	2.4%	0.9%	100%
2008 Source Contribution (µg/m³)			17.5	0.1	0.0	0.0	0.1	5.7	20.5	9.9	0.9	173.1	21.2	7.6	5.9	2.2	**264.9**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-1. Distance-Weighted Emissions for Pinal County Housing (PCH) 1/1/2008 High Wind Design Day

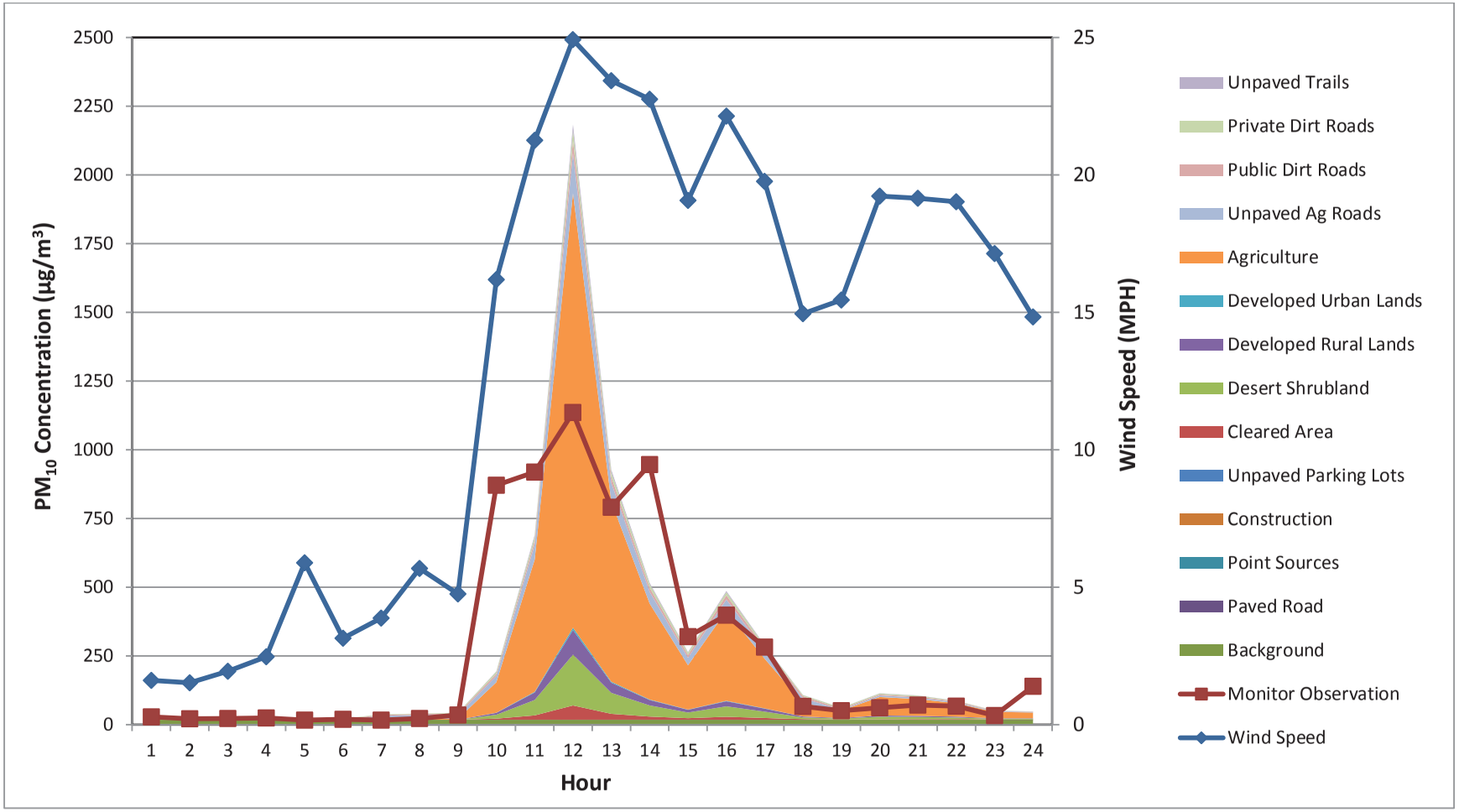


Table 3-2. Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at Cowtown (CWT) on 4/27/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	Monitor Observation	Point Sources	Paved Road	Construction	Cleared Area	Unpaved Parking Lots	County Desert Shrubland	Tribal Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	CAFOs	County Agriculture	Tribal Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Tribal Unpaved Roads	Unpaved Test Tracks	Total
1	6.0	332	68.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.5
2	0.7	321	73.0	0.2	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	6.2
3	5.8	315	88.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.0	9.9
4	3.8	84	59.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.7	0.0	0.0	0.0	0.0	1.3
5	2.1	26	92.3	5.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.4	0.0	0.0	0.0	7.6
6	2.4	157	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.8	0.0	0.5	0.0	18.7	0.0	0.0	7.1	0.0	137.1
7	1.6	229	326.4	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	329.6	1.9	6.3	11.4	30.0	0.0	0.0	23.8	0.0	403.2
8	2.1	12	222.0	0.2	0.9	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	33.0	0.2	8.7	0.2	0.0	0.0	45.6
9	10.7	33	372.4	0.2	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.0	26.7	9.6	0.5	0.0	0.0	71.6
10	19.6	53	886.8	0.2	0.4	257.4	27.4	0.3	828.5	163.4	83.2	1.5	0.0	0.0	1136.0	0.0	179.7	62.8	109.0	14.6	32.3	32.3	2929.0
11	17.3	44	107.7	0.2	0.6	73.1	7.8	0.2	235.2	46.4	23.6	0.4	0.0	0.0	324.1	0.0	73.0	37.3	32.7	4.4	9.2	9.2	877.4
12	15.4	43	122.3	0.2	0.6	31.0	3.3	0.3	99.8	19.7	10.0	0.2	0.0	0.0	138.9	0.0	49.4	39.3	18.0	2.1	3.9	3.9	420.6
13	17.4	37	72.0	0.2	0.8	68.2	7.3	0.2	219.6	43.3	22.0	0.4	0.0	0.0	302.9	0.0	67.5	37.4	41.4	4.1	8.6	8.6	832.4
14	14.5	44	38.4	0.2	0.7	22.7	2.5	0.3	79.8	15.7	8.0	0.1	0.0	0.0	106.4	0.0	43.0	36.2	15.3	1.6	2.8	2.8	338.1
15	15.8	50	36.4	0.2	0.7	27.3	2.9	0.2	87.7	17.3	8.8	0.2	0.0	0.0	121.7	0.0	44.8	38.8	16.7	2.0	3.4	3.4	376.0
16	14.9	51	23.1	0.2	1.4	18.4	2.1	0.2	64.8	12.8	6.5	0.1	0.0	0.0	86.5	0.0	39.9	36.8	13.0	1.5	2.3	2.3	288.7
17	11.9	59	69.7	0.2	0.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	29.7	32.9	5.2	0.6	0.0	0.0	70.4
18	9.0	69	101.2	0.0	0.7	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	25.0	33.7	4.4	0.2	0.9	0.0	66.3
19	5.2	41	230.1	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	12.8	3.4	0.0	0.0	0.0	17.5
20	4.0	8	72.9	0.2	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	10.3	0.0	0.0	0.0	11.7
21	2.9	37	79.7	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.4	10.5	0.0	0.0	0.0	17.2
22	3.0	35	42.6	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	4.7	2.7	0.0	0.0	0.0	8.6
23	3.8	112	232.5	0.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	4.7	1.9	0.0	0.1	0.0	8.9
24	3.2	9	127.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0
24-Hour Average			168.3	0.3	0.6	20.8	2.2	0.1	67.3	13.3	6.8	0.1	0.0	18.9	92.9	0.3	26.1	19.1	12.8	1.3	3.9	2.6	289.5
% Contribution[a]			-	0.1%	0.2%	7.2%	0.8%	0.1%	23.3%	4.6%	2.3%	0.0%	0.0%	6.5%	32.1%	0.1%	9.0%	6.6%	4.4%	0.5%	1.4%	0.9%	100%
2008 Source Contribution (μg/m³)			17.5	0.2	0.3	10.8	1.2	0.1	35.1	6.9	3.5	0.1	0.0	9.8	48.4	0.1	13.6	10.0	6.6	0.7	2.0	1.4	**168.3**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-2. Distance-Weighted Emissions for Cowtown (CWT) 4/27/2008 High Wind Design Day

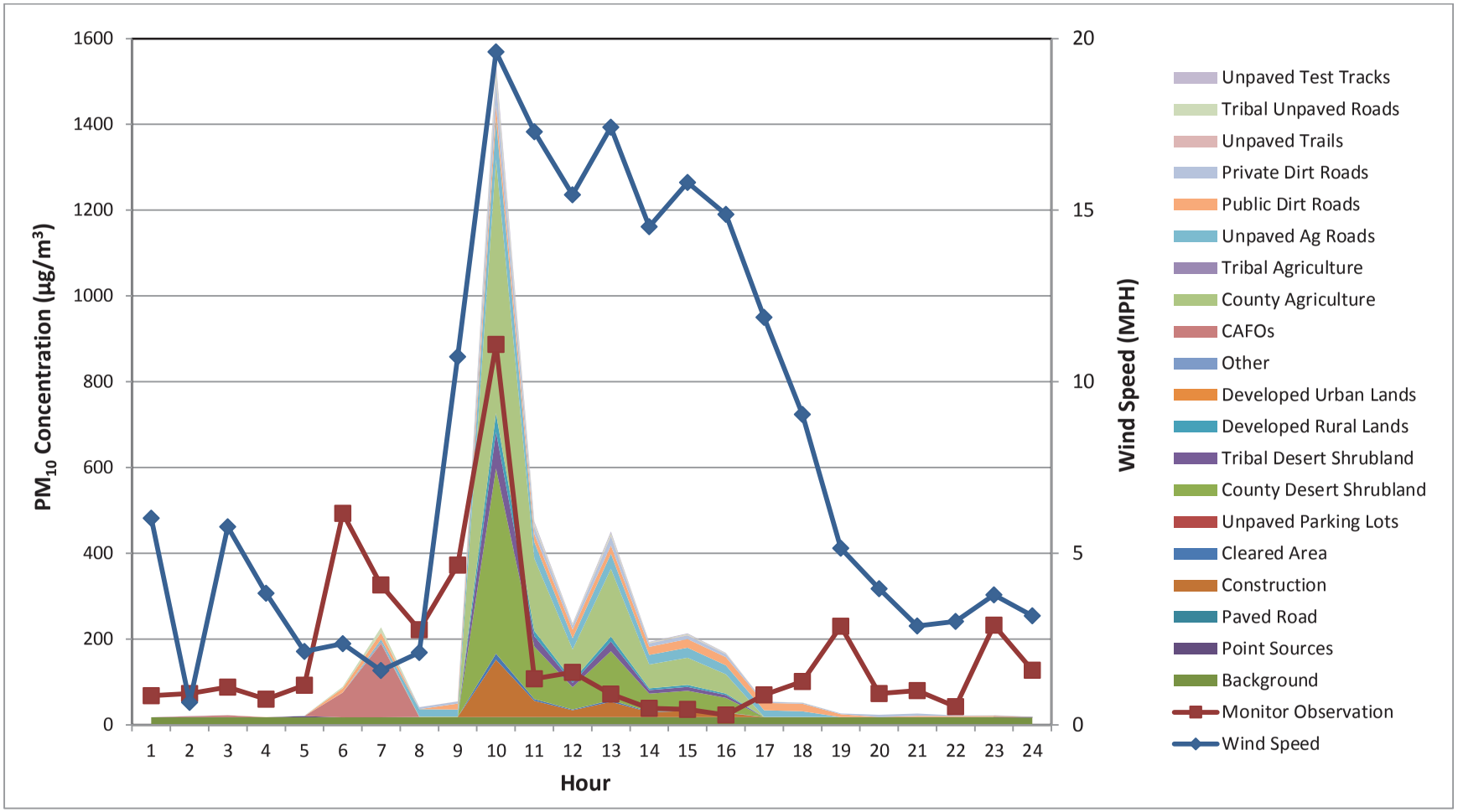


Table 3-3. Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at Maricopa on 10/27/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	Monitor Obs-ervation	Paved Road	Con-struction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	County Agri-culture	Tribal Agri-culture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Tribal Unpaved	Total
1	4.5	160.0	239.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	1.4
2	2.4	106.0	143.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	1.2
3	1.6	6.0	70.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.7
4	1.6	348.0	73.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
5	2.9	290.0	98.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1.1
6	2.4	241.0	91.8	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.1
7	1.6	215.0	129.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	21.8	26.1
8	6.9	82.0	160.4	4.6	119.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	11.0	2.9	1.3	0.1	0.0	142.5
9	16.0	84.0	326.2	4.5	316.7	0.0	57.0	1.9	32.7	24.0	23.8	3.2	72.6	0.0	17.9	3.7	7.4	0.4	0.0	565.6
10	20.7	85.0	852.9	4.4	1455.1	0.0	345.9	2.2	190.6	139.7	155.0	18.8	428.8	0.0	57.8	10.7	40.1	2.0	0.0	2851.1
11	23.6	81.0	496.5	4.2	1356.0	0.0	319.1	2.1	175.9	128.9	143.0	17.4	395.7	0.0	54.8	9.6	36.1	1.9	0.0	2644.6
12	21.0	82.0	293.2	4.5	791.4	0.0	173.3	2.3	95.5	70.0	77.7	9.4	215.3	0.0	34.8	7.1	21.8	1.0	0.0	1504.0
13	21.9	79.0	176.0	4.9	584.0	0.0	120.0	2.1	66.1	48.4	53.8	6.5	149.3	0.0	27.6	5.4	15.0	0.7	0.0	1083.9
14	21.6	74.0	141.9	4.5	524.1	0.0	93.3	2.2	51.4	37.7	41.8	5.1	116.3	0.1	22.2	4.0	11.5	0.6	0.0	914.7
15	19.9	72.0	84.8	4.5	335.0	0.0	45.5	1.9	26.1	19.2	19.0	2.5	58.2	0.1	14.9	0.9	5.7	0.3	0.0	533.9
16	17.6	71.0	76.6	4.5	257.7	0.0	24.6	1.9	14.1	10.4	10.3	1.4	31.9	0.1	12.0	0.5	3.4	0.1	0.0	372.9
17	16.0	72.0	68.6	5.3	201.8	0.0	9.5	1.8	5.5	4.0	4.0	0.5	12.8	0.1	10.3	0.2	1.9	0.1	0.0	257.7
18	10.8	62.0	60.4	4.0	0.0	0.0	0.0	1.7	0.0	0.0	0.7	0.1	0.6	0.3	6.7	0.0	1.0	0.0	1.7	16.7
19	8.8	61.0	56.2	4.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.4	5.6
20	9.1	68.0	45.1	2.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.1	3.7
21	11.9	70.0	36.1	2.4	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	3.2
22	12.2	80.0	30.8	2.7	6.4	0.0	1.8	0.1	1.1	0.8	0.7	0.1	2.3	0.0	0.2	0.5	0.6	0.0	0.0	17.4
23	11.3	82.0	33.2	1.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	2.6
24	11.1	78.0	38.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	1.5
24-Hour Average			159.4	2.9	247.8	0.0	49.6	1.0	27.5	20.1	22.1	2.7	61.9	0.1	11.3	2.0	6.2	0.3	1.1	456.5
% Contribution [a]			-	0.6%	54.3%	0.0%	10.9%	0.2%	6.0%	4.4%	4.8%	0.6%	13.6%	0.0%	2.5%	0.4%	1.4%	0.1%	0.2%	100%
2008 Source Contribution (μg/m³)			17.5	0.9	77.0	0.0	15.4	0.3	8.5	6.3	6.9	0.8	19.2	0.0	3.5	0.6	1.9	0.1	0.3	**159.4**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-3. Distance-Weighted Emissions for Maricopa 10/27/2008 High Wind Design Day

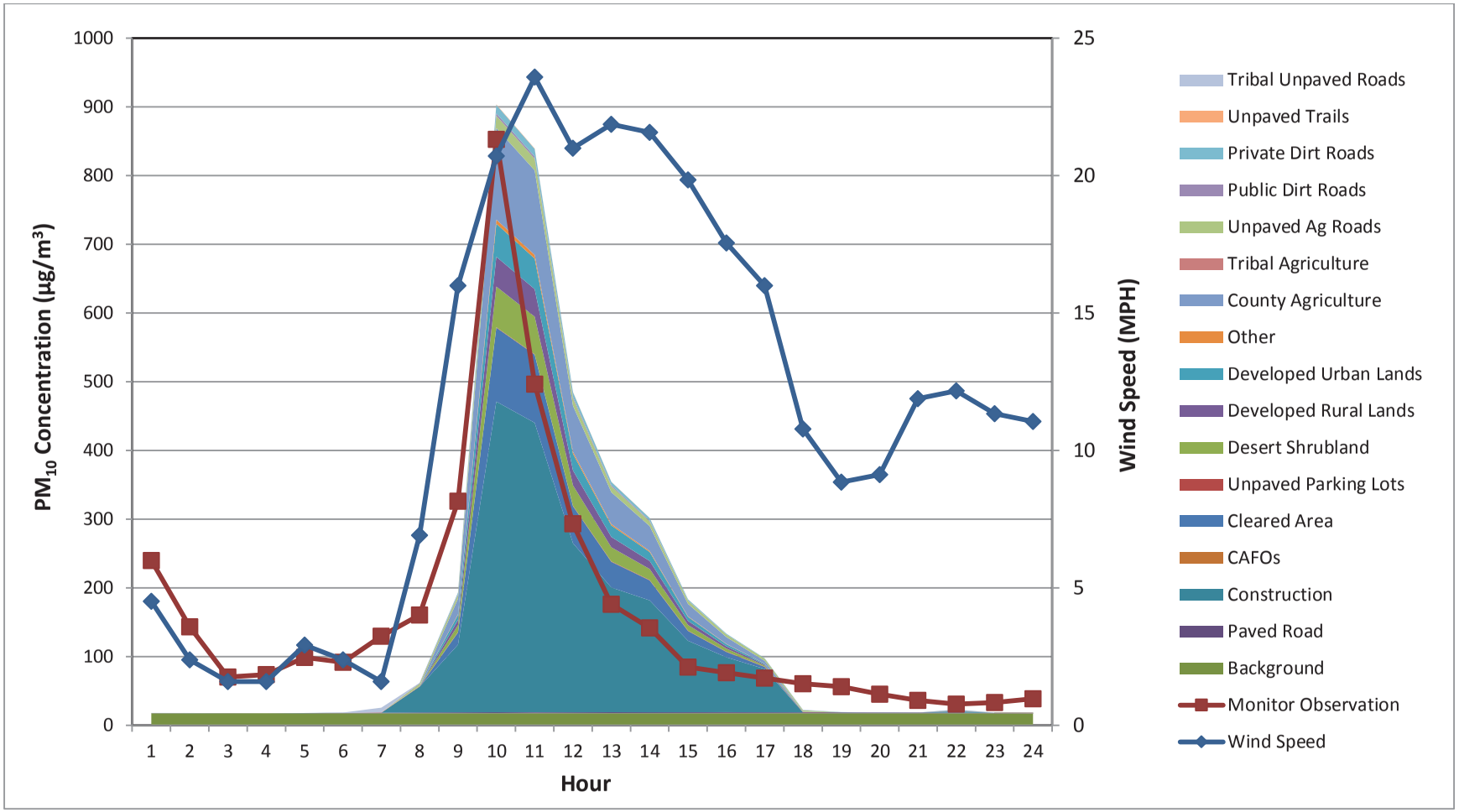


Table 3-4. Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at Stanfield (STF) on 11/21/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	Monitor Obs-ervation	Paved Road	Con-struction	CAFOs	Dairy	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Agri-culture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Total
1	3.5	119.2	112.4	0.1	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	3.8
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2	0.0	2.0
3	3.4	117.3	157.4	0.1	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.2	0.0	6.5
4	3.7	125.4	158.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
5	3.2	274.2	102.3	0.2	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	31.3
6	3.4	240.9	234.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.2	0.0	4.8
7	13.2	85.5	357.4	1.1	0.0	47.2	0.0	8.2	0.4	60.1	12.3	239.2	58.9	24.3	10.9	7.0	469.6
8	14.7	81.9	326.6	1.6	0.0	50.3	0.0	9.3	0.4	68.2	13.9	270.6	63.4	33.0	10.1	8.0	528.7
9	16.3	82.2	584.6	1.5	0.0	121.2	0.0	33.2	0.4	233.3	47.7	987.2	107.6	37.7	31.6	25.8	1627.2
10	16.0	81.1	429.2	1.0	0.0	62.6	0.0	13.1	0.5	91.9	18.8	394.8	71.1	31.9	18.2	11.8	715.7
11	16.0	80.2	334.3	1.0	0.0	35.1	0.0	11.3	0.4	79.3	16.2	342.3	63.7	28.2	14.2	10.5	602.3
12	14.6	80.4	186.1	1.1	0.0	32.8	0.0	4.8	0.5	34.8	7.1	143.3	51.1	30.4	11.2	5.5	322.5
13	12.2	79.2	93.9	1.2	0.0	7.5	0.0	2.1	0.4	15.4	3.2	68.5	46.9	26.8	7.0	3.7	182.8
14	11.1	78.5	65.1	1.2	0.0	1.7	0.0	0.0	0.5	0.0	0.0	9.4	43.8	29.9	8.6	2.3	97.3
15	10.2	75.3	64.8	0.6	0.0	1.7	0.0	0.0	0.5	0.0	0.0	9.1	44.8	38.0	6.8	2.4	103.8
16	8.2	77.2	65.2	1.8	0.0	2.3	0.0	0.0	0.5	0.0	0.0	8.8	43.9	38.8	7.3	2.3	105.6
17	5.9	74.7	87.1	1.3	0.0	2.8	0.0	0.0	0.4	0.0	0.0	9.5	44.8	40.3	5.3	2.4	106.8
18	4.0	73.8	104.6	1.3	0.0	4.0	0.0	0.0	0.4	0.0	0.0	9.7	45.4	36.3	4.4	2.5	104.0
19	5.3	75.1	88.3	0.7	0.0	5.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	20.6	4.6	0.0	31.1
20	4.6	86.2	56.1	1.0	0.0	44.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.3	3.5	0.0	60.1
21	2.3	158.4	98.3	0.1	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	7.5	0.8	0.0	8.8
22	1.9	230.2	249.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.9	0.0	3.3
23	2.5	270.1	171.6	0.6	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	10.4
24	2.1	291.4	99.5	0.0	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	9.5
24-Hour Average			178.6	0.8	0.0	19.8	0.0	3.4	0.2	24.3	5.0	103.8	28.6	18.5	6.3	3.5	214.1
% Contribution [a]			-	0.4%	0.0%	9.2%	0.0%	1.6%	0.1%	11.3%	2.3%	48.5%	13.3%	8.6%	2.9%	1.6%	100%
2008 Source Contribution (µg/m³)			17.5	0.6	0.0	14.9	0.0	2.6	0.2	18.3	3.7	78.1	21.5	13.9	4.7	2.6	**178.6**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-4. Distance-Weighted Emissions for Stanfield (STF) 11/21/2008 High Wind Design Day

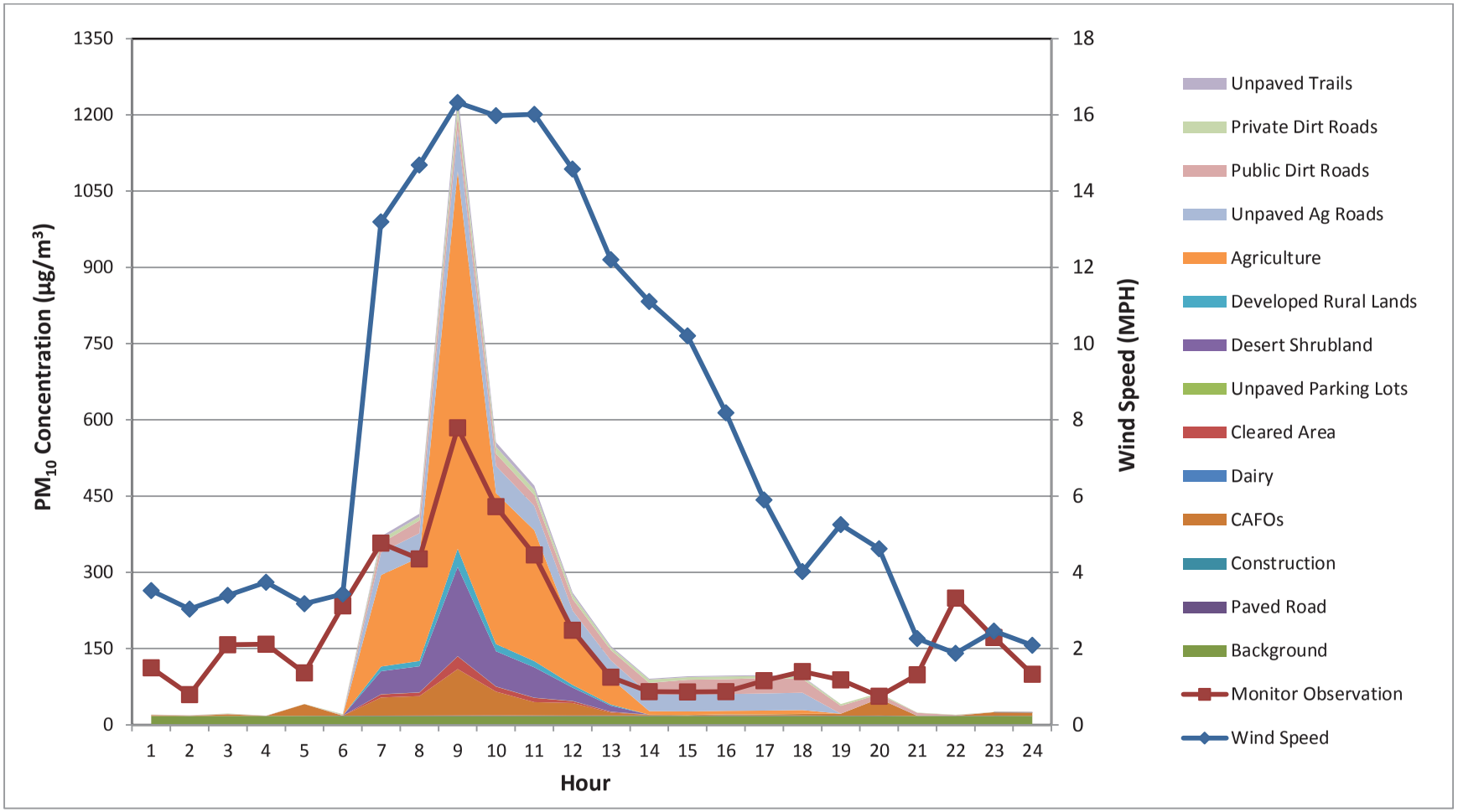


Figure 3-5. 2008 High Wind Design Day Source Contributions

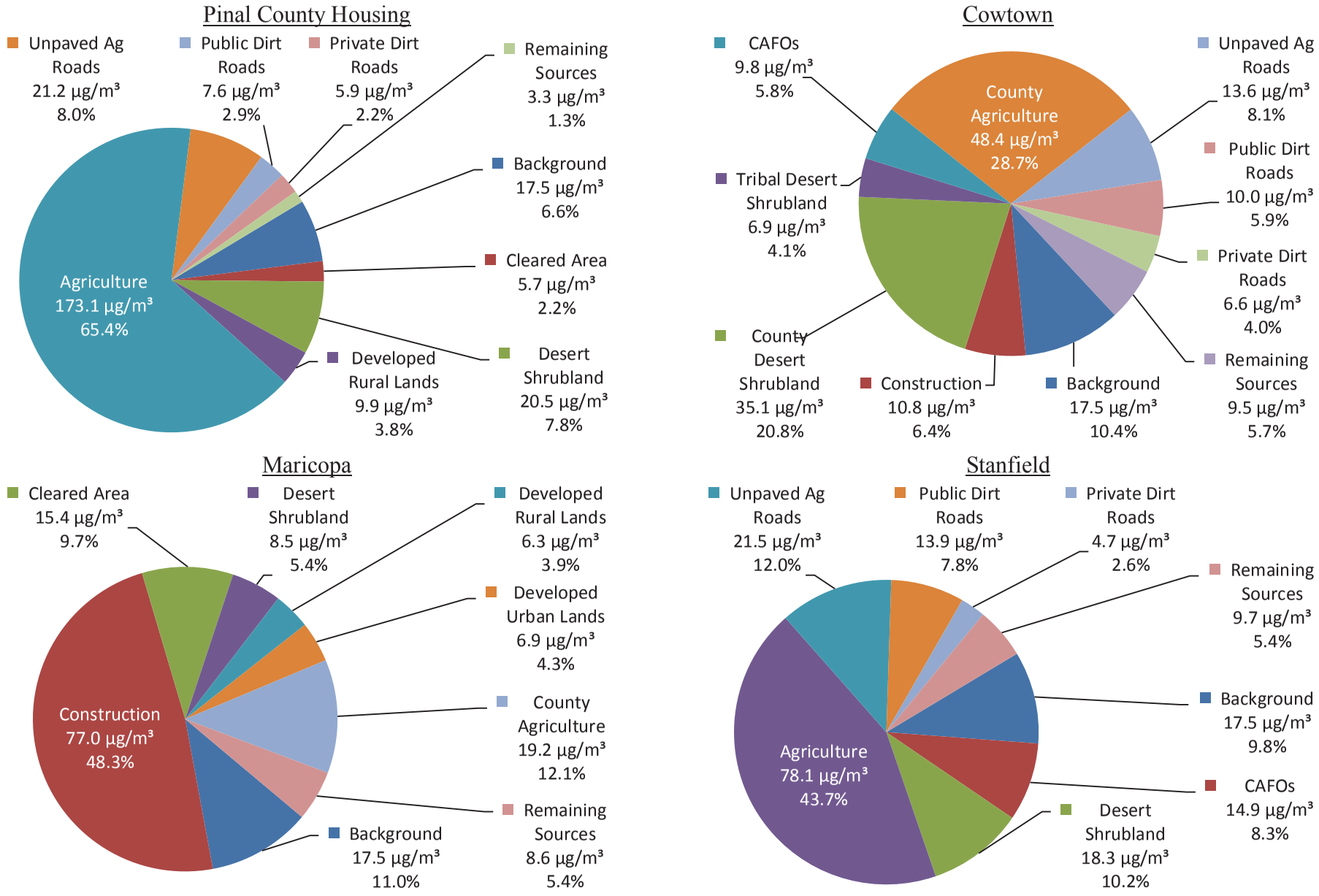


Table 3-5. Projected 2018 Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at PCH on 1/1/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	2008 Monitor Observation	Paved Road	Point Sources	Construction	Unpaved Parking Lots	Cleared Area	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Agri-culture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Total
1	1.6	303.8	28.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	0.0	1.4
2	1.5	318.0	21.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.7	0.0	4.2
3	1.9	335.4	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	0.0	2.9
4	2.5	333.7	24.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.7
5	5.9	352.2	16.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.4	0.0	3.2
6	3.1	299.6	19.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	5.7	3.1	0.0	9.0
7	3.9	339.3	16.2	0.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	12.7	46.4	15.3	11.9	0.9	89.1
8	5.7	5.0	22.7	1.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	14.0	61.6	11.9	6.1	0.1	96.4
9	4.8	53.9	34.7	0.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	15.2	61.2	20.1	11.5	0.4	109.5
10	16.2	41.2	871.2	0.7	0.0	1.5	0.7	16.2	60.2	29.1	2.5	473.0	97.2	28.0	34.8	6.3	750.3
11	21.3	46.3	919.3	0.8	0.0	0.0	0.5	67.0	238.9	115.6	11.0	2050.2	231.4	39.6	59.9	26.5	2841.4
12	24.9	49.6	1136.1	0.5	0.0	0.0	0.6	221.0	787.7	381.0	36.2	6735.9	621.4	91.8	166.8	86.5	9129.3
13	23.4	48.5	790.7	0.5	0.0	0.0	0.5	91.3	325.4	157.4	15.0	2790.1	291.4	48.9	77.5	36.0	3834.0
14	22.8	48.3	946.1	0.5	0.0	0.0	0.6	48.5	172.8	83.6	8.0	1487.7	183.2	37.8	61.0	19.3	2103.0
15	19.1	47.6	320.0	0.5	0.0	0.0	0.5	23.7	87.9	42.5	3.6	686.7	115.5	32.5	37.9	9.0	1040.4
16	22.1	53.6	397.9	0.8	0.0	0.0	0.5	45.3	161.7	78.2	7.4	1394.7	177.0	42.9	50.8	18.1	1977.4
17	19.8	53.6	281.9	0.9	0.0	0.0	0.5	26.4	98.0	47.4	4.0	768.6	124.0	36.3	31.5	10.0	1147.6
18	15.0	50.6	65.8	0.8	0.0	0.0	0.6	7.3	28.1	13.6	1.0	207.5	76.7	27.0	18.4	2.7	383.7
19	15.5	54.6	50.9	0.8	0.0	0.0	0.1	4.1	15.2	7.3	0.6	116.6	9.7	15.6	16.2	1.5	187.7
20	19.2	58.1	61.5	0.6	0.0	0.0	0.1	10.0	37.2	18.0	1.5	285.8	23.8	11.9	16.4	3.6	408.9
21	19.2	56.7	70.6	0.4	0.0	0.0	0.1	9.1	33.8	16.4	1.4	259.8	21.7	12.3	17.4	3.3	375.7
22	19.0	57.4	67.6	0.4	0.0	0.0	0.0	7.3	27.0	13.1	1.1	207.8	17.3	10.2	7.6	2.6	294.5
23	17.1	55.7	32.7	0.2	0.0	0.0	0.0	3.5	12.8	6.2	0.5	98.7	8.2	6.1	5.0	1.3	142.7
24	14.8	54.6	139.3	0.1	0.0	0.0	0.0	3.4	13.0	6.3	0.5	89.3	7.4	4.1	2.9	1.1	128.1
24-Hour Average			264.9	0.5	0.0	0.1	0.4	24.3	87.5	42.3	3.9	737.3	90.6	21.1	26.7	9.5	1044.3
% Contribution [a]			-	0.0%	0.0%	0.0%	0.0%	2.3%	8.4%	4.1%	0.4%	70.6%	8.7%	2.0%	2.6%	0.9%	100%
2018 Source Contribution (µg/m³)			17.5	0.1	0.0	0.0	0.1	5.7	20.5	9.9	0.9	173.1	21.3	5.0	6.3	2.2	**262.7**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-6. Forecast of 2018 Distance-Weighted Emissions for Pinal County Housing (PCH) 1/1/2008 High Wind Design Day

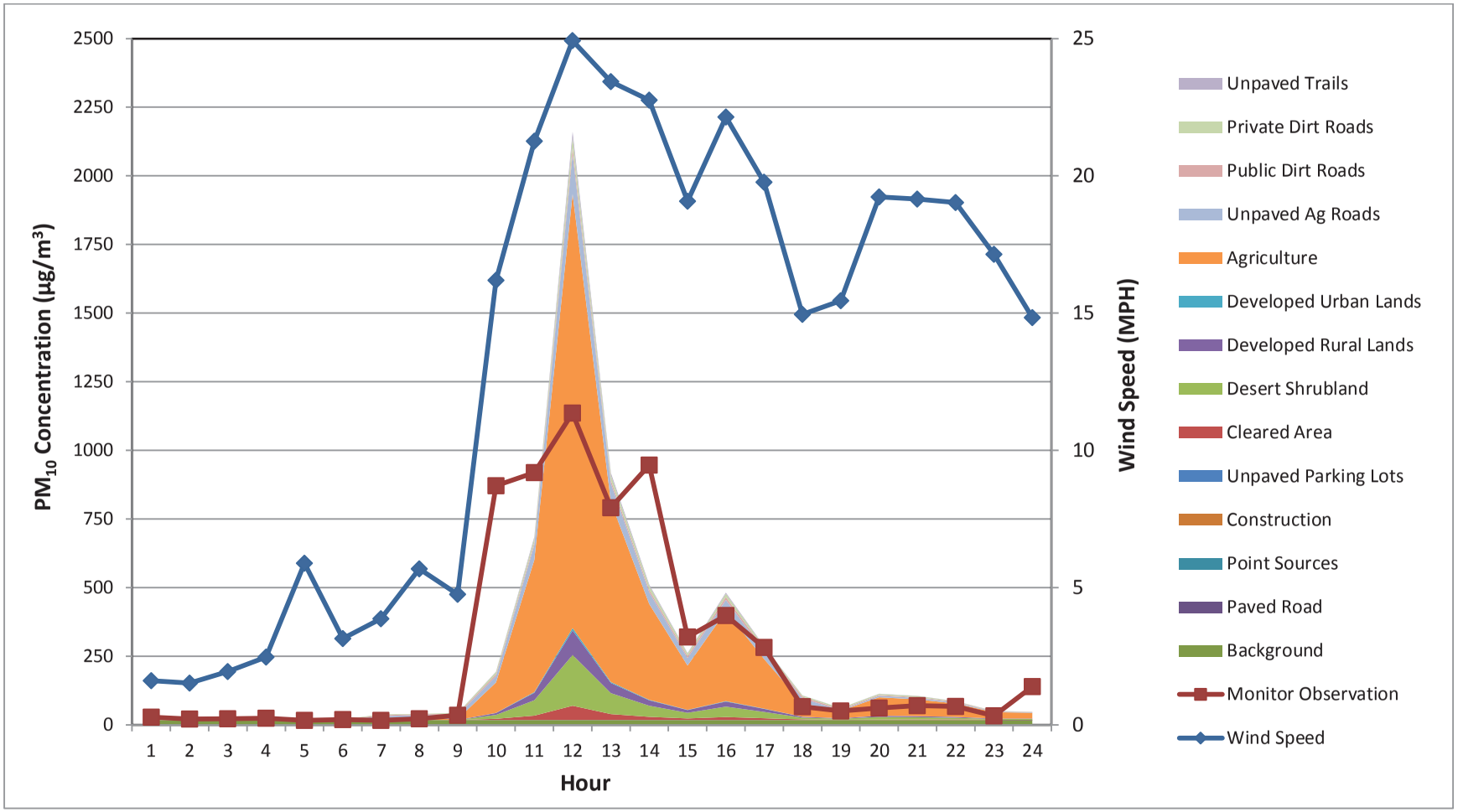


Table 3-6. Projected 2018 Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at CWT on 4/27/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	2008 Mon-itor Obs-ervation	Point Sources	Paved Road	Con-struction	Cleared Area	Unpaved Parking Lots	County Desert Shrubland	Tribal Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	CAFOs	County Agri-culture	Tribal Agri-culture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Tribal Unpaved Roads	Unpaved Test Tracks	Total
1	6.0	332	68.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	1.0
2	0.7	321	73.0	1.0	1.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	3.2
3	5.8	315	88.1	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	0.0	2.6
4	3.8	84	59.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.0	0.0	1.5
5	2.1	26	92.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	1.6	0.0	0.0	0.0	2.7
6	2.4	157	492.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	21.8	0.0	0.0	8.2	0.0	30.7
7	1.6	229	326.4	0.3	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	329.6	1.9	6.3	11.4	35.1	0.0	0.0	25.6	0.0	410.6
8	2.1	12	222.0	1.4	1.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	33.0	0.2	10.2	0.2	0.0	0.0	49.0
9	10.7	33	372.4	1.7	1.8	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	31.0	31.2	11.2	0.5	0.0	0.0	79.8
10	19.6	53	886.8	0.6	0.6	165.5	27.4	0.3	828.5	163.4	83.2	5.8	0.1	0.0	1136.0	0.0	179.7	68.6	95.5	14.6	32.3	32.3	2834.5
11	17.3	44	107.7	0.8	0.9	47.0	7.8	0.2	235.2	46.4	23.6	1.6	0.0	0.0	324.1	0.0	73.0	42.2	29.3	4.4	9.2	9.2	855.1
12	15.4	43	122.3	0.9	0.9	19.9	3.3	0.3	99.8	19.7	10.0	0.7	0.0	0.0	138.9	0.0	49.4	45.3	17.2	2.1	3.9	3.9	416.3
13	17.4	37	72.0	1.1	1.2	43.9	7.3	0.2	219.6	43.3	22.0	1.5	0.0	0.0	302.9	0.0	67.5	42.4	39.8	4.1	8.6	8.6	814.0
14	14.5	44	38.4	0.9	1.0	14.6	2.5	0.3	79.8	15.7	8.0	0.5	0.0	0.0	106.4	0.0	43.0	41.9	15.1	1.6	2.8	2.8	337.0
15	15.8	50	36.4	1.0	1.0	17.5	2.9	0.2	87.7	17.3	8.8	0.6	0.0	0.0	121.7	0.0	44.8	44.8	16.1	2.0	3.4	3.4	373.5
16	14.9	51	23.1	1.8	1.9	11.8	2.1	0.2	64.8	12.8	6.5	0.4	0.0	0.0	86.5	0.0	39.9	42.6	13.0	1.5	2.3	2.3	290.4
17	11.9	59	69.7	1.1	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	29.7	38.5	6.1	0.6	0.0	0.0	78.2
18	9.0	69	101.2	1.2	1.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	25.0	39.4	5.1	0.2	1.0	0.0	74.5
19	5.2	41	230.1	0.9	1.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	14.9	4.0	0.0	0.0	0.0	21.5
20	4.0	8	72.9	0.8	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	12.0	0.0	0.0	0.0	14.4
21	2.9	37	79.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	6.3	12.2	0.0	0.0	0.0	20.7
22	3.0	35	42.6	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	5.5	3.2	0.0	0.0	0.0	10.7
23	3.8	112	232.5	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	5.5	2.3	0.0	0.1	0.0	12.9
24	3.2	9	127.5	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.2	0.0	0.0	0.0	2.6
24-Hour Average			168.3	0.9	0.9	13.3	2.2	0.1	67.3	13.3	6.8	0.5	0.0	13.7	92.9	0.3	26.1	22.0	12.4	1.3	4.1	2.6	280.7
% Contribution [a]			-	0.3%	0.3%	4.8%	0.8%	0.1%	24.0%	4.7%	2.4%	0.2%	0.0%	4.9%	33.1%	0.1%	9.3%	7.8%	4.4%	0.5%	1.4%	0.9%	100%
2018 Source Contribution (µg/m³)			17.5	0.5	0.5	7.0	1.2	0.1	35.1	6.9	3.5	0.2	0.0	7.2	48.4	0.1	13.6	11.5	6.4	0.7	2.1	1.4	**163.7**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-7. Forecast of 2018 Distance-Weighted Emissions for Cowtown (CWT) 4/27/2008 High Wind Design Day

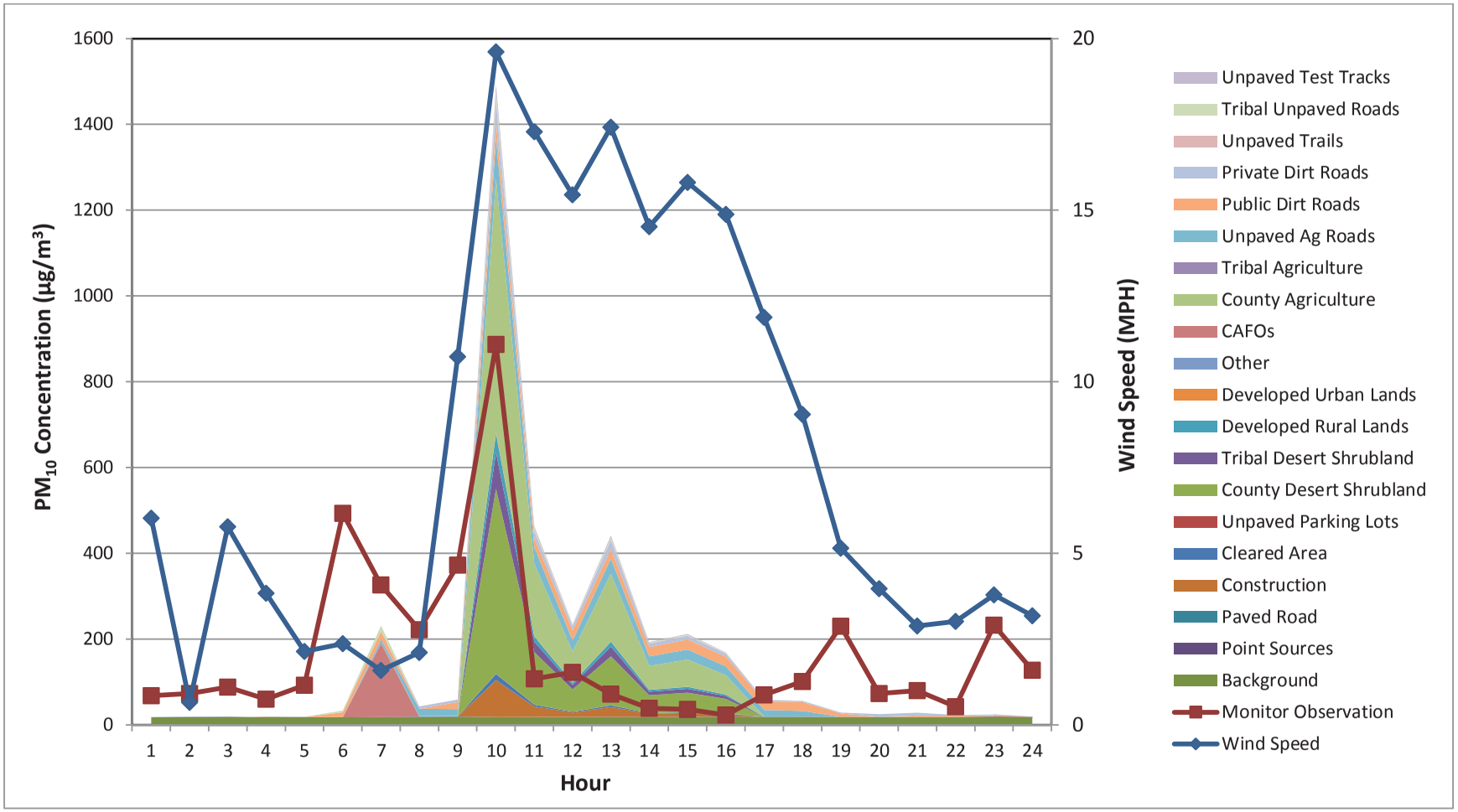


Table 3-7. Projected 2018 Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at Maricopa on 10/27/2008 Design Day

Hour	Wind Speed (mph)	Wind Direction (degrees)	2008 Monitor Observation	Paved Road	Construction	CAFOs	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Developed Urban Lands	Other	County Agri-culture	Tribal Agri-culture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Tribal Unpaved Roads	Total
1	4.5	160.0	239.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	1.3
2	2.4	106.0	143.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	1.3
3	1.6	6.0	70.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.7
4	1.6	348.0	73.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
5	2.9	290.0	98.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.3
6	2.4	241.0	91.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	3.5
7	1.6	215.0	129.8	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	22.7	27.1
8	6.9	82.0	160.4	5.6	77.1	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.8	0.0	11.0	3.4	1.4	0.0	0.0	101.3
9	16.0	84.0	326.2	5.5	229.8	0.0	57.0	1.9	32.7	24.0	25.8	3.2	72.6	0.0	17.9	4.1	7.0	0.3	0.0	482.0
10	20.7	85.0	852.9	5.5	1102.1	0.0	345.9	2.2	190.6	139.7	168.2	18.8	428.8	0.0	57.8	11.2	36.9	2.0	0.0	2509.8
11	23.6	81.0	496.5	5.2	1025.5	0.0	319.1	2.1	175.9	128.9	155.2	17.4	395.7	0.0	54.8	10.1	33.0	1.8	0.0	2324.7
12	21.0	82.0	293.2	5.6	592.3	0.0	173.3	2.3	95.5	70.0	84.3	9.4	215.3	0.0	34.8	7.6	20.3	1.0	0.0	1311.8
13	21.9	79.0	176.0	6.1	433.3	0.0	120.0	2.1	66.1	48.4	58.4	6.5	149.3	0.0	27.6	5.9	14.0	0.7	0.0	938.5
14	21.6	74.0	141.9	5.6	381.9	0.0	93.3	2.2	51.4	37.7	45.4	5.1	116.3	0.1	22.2	4.3	10.5	0.5	0.0	776.6
15	19.9	72.0	84.8	5.7	236.3	0.0	45.5	1.9	26.1	19.2	20.6	2.5	58.2	0.1	14.9	0.9	5.3	0.2	0.0	437.5
16	17.6	71.0	76.6	5.5	177.0	0.0	24.6	1.9	14.1	10.4	11.2	1.4	31.9	0.1	11.9	0.5	3.4	0.1	0.0	294.0
17	16.0	72.0	68.6	6.5	134.1	0.0	9.5	1.8	5.5	4.0	4.3	0.5	12.8	0.1	10.3	0.2	1.7	0.1	0.0	191.4
18	10.8	62.0	60.4	4.6	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.6	0.3	6.5	0.0	0.9	0.0	1.7	16.3
19	8.8	61.0	56.2	5.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.4	6.8
20	9.1	68.0	45.1	3.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.2	4.5
21	11.9	70.0	36.1	3.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	3.9
22	12.2	80.0	30.8	3.4	4.9	0.0	1.8	0.1	1.1	0.8	0.8	0.1	2.3	0.0	0.2	0.5	0.7	0.0	0.0	16.8
23	11.3	82.0	33.2	2.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	3.2
24	11.1	78.0	38.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	1.8
24-Hour Average			159.4	3.6	183.1	0.0	49.6	1.0	27.5	20.1	23.9	2.7	61.9	0.1	11.2	2.1	5.8	0.3	1.1	394.0
% Contribution [a]			-	0.9%	46.5%	0.0%	12.6%	0.2%	7.0%	5.1%	6.1%	0.7%	15.7%	0.0%	2.9%	0.5%	1.5%	0.1%	0.3%	100%
2018 Source Contribution ($\mu g/m^3$)			17.5	1.1	56.9	0.0	15.4	0.3	8.5	6.3	7.4	0.8	19.2	0.0	3.5	0.7	1.8	0.1	0.4	**140.0**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-8. Forecast of 2018 Distance-Weighted Emissions for Maricopa 10/27/2008 High Wind Design Day

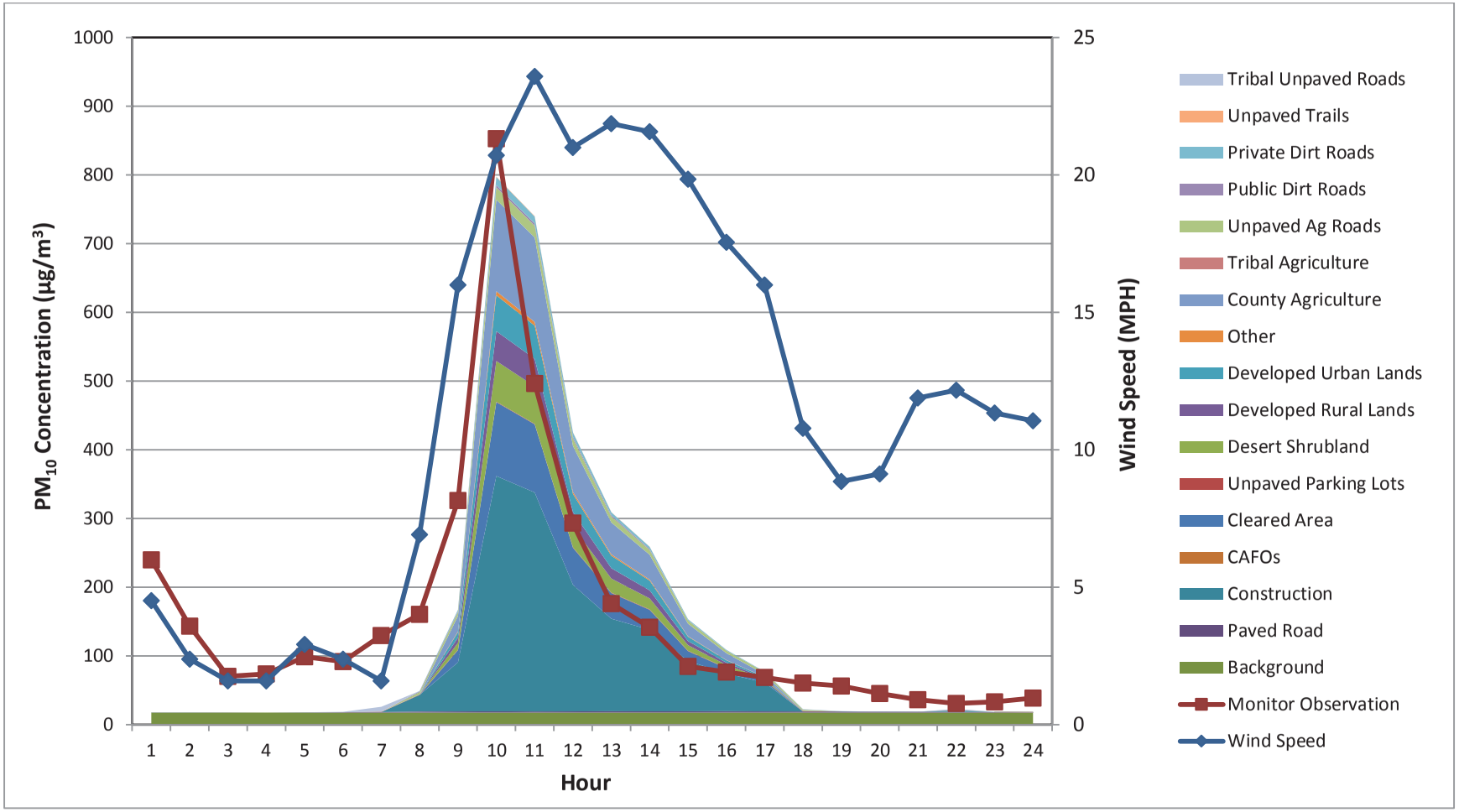


Table 3-8. Projected 2018 Distance-Weighted Emissions (lbs/mile) for the High Wind Modeling Domain at STF on 11/21/2008 Design Day

Hour	Wind Speed mph (H=10m)	Wind Direction (degrees)	2008 Monitor Observation	Paved Road	Construction	CAFOs	Dairy	Cleared Area	Unpaved Parking Lots	Desert Shrubland	Developed Rural Lands	Agriculture	Unpaved Ag Roads	Public Dirt Roads	Private Dirt Roads	Unpaved Trails	Total
1	3.5	119.2	112.4	0.1	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.6	0.0	6.6
2	3.0	161.6	59.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	0.0	2.4
3	3.4	117.3	157.4	0.0	0.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.5	0.0	12.1
4	3.7	125.4	158.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.3
5	3.2	274.2	102.3	0.2	0.0	31.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	33.9
6	3.4	240.9	234.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.6	0.0	5.8
7	13.2	85.5	357.4	1.1	0.0	66.2	4.4	0.4	8.2	60.1	12.3	239.2	58.9	27.9	11.7	7.0	497.4
8	14.7	81.9	326.6	1.8	0.6	68.6	5.0	0.4	9.3	68.2	13.9	270.6	63.4	38.0	10.5	8.0	558.3
9	16.3	82.2	584.6	1.6	0.6	125.7	18.8	0.4	33.2	233.3	47.7	987.2	107.6	42.0	32.2	25.8	1656.1
10	16.0	81.1	429.2	0.9	0.6	78.6	7.4	0.5	13.1	91.9	18.8	394.8	71.1	36.4	19.4	11.8	745.3
11	16.0	80.2	334.3	0.9	0.6	26.4	6.4	0.4	11.3	79.3	16.2	342.3	63.7	32.2	15.1	10.5	605.4
12	14.6	80.4	186.1	1.0	0.6	48.9	2.6	0.5	4.8	34.8	7.1	143.3	51.1	35.2	12.4	5.5	347.7
13	12.2	79.2	93.9	1.1	0.6	4.7	1.1	0.4	2.1	15.4	3.2	68.5	46.9	31.3	7.9	3.7	186.9
14	11.1	78.5	65.1	1.1	0.6	0.0	0.0	0.5	0.0	0.0	0.0	9.4	43.8	35.0	10.0	2.3	102.6
15	10.2	75.3	64.8	1.0	0.6	0.0	0.0	0.5	0.0	0.0	0.0	9.1	44.8	44.4	8.0	2.4	110.6
16	8.2	77.2	65.2	2.2	0.6	0.0	0.0	0.5	0.0	0.0	0.0	8.8	43.9	45.3	8.5	2.3	112.0
17	5.9	74.7	87.1	1.9	0.6	0.0	0.0	0.4	0.0	0.0	0.0	9.5	44.8	47.0	6.2	2.4	112.9
18	4.0	73.8	104.6	2.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	9.7	45.4	42.4	5.1	2.5	107.5
19	5.3	75.1	88.3	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	24.0	5.4	0.0	30.6
20	4.6	86.2	56.1	0.9	0.0	86.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1	4.1	0.0	104.5
21	2.3	158.4	98.3	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	8.7	0.9	0.0	10.2
22	1.9	230.2	249.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.1	0.0	4.1
23	2.5	270.1	171.6	0.9	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	10.8
24	2.1	291.4	99.5	0.1	0.0	9.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	10.3
24-Hour Average			178.6	0.9	0.3	23.7	2.1	0.2	3.4	24.3	5.0	103.8	28.6	21.4	6.9	3.5	224.0
% Contribution [a]			-	0.4%	0.1%	10.6%	0.9%	0.1%	1.5%	10.8%	2.2%	46.4%	12.7%	9.5%	3.1%	1.6%	100%
2018 Source Contribution (μg/m³)			17.5	0.7	0.2	17.8	1.5	0.2	2.6	18.3	3.7	78.1	21.5	16.1	5.2	2.6	**186.0**

a. Percentage Contribution is based on source only, without considering the background concentrations.

Shaded Area = High Wind Hours

Figure 3-9. Forecast of 2018 Distance-Weighted Emissions for Stanfield (STF) 11/21/2008 High Wind Design Day

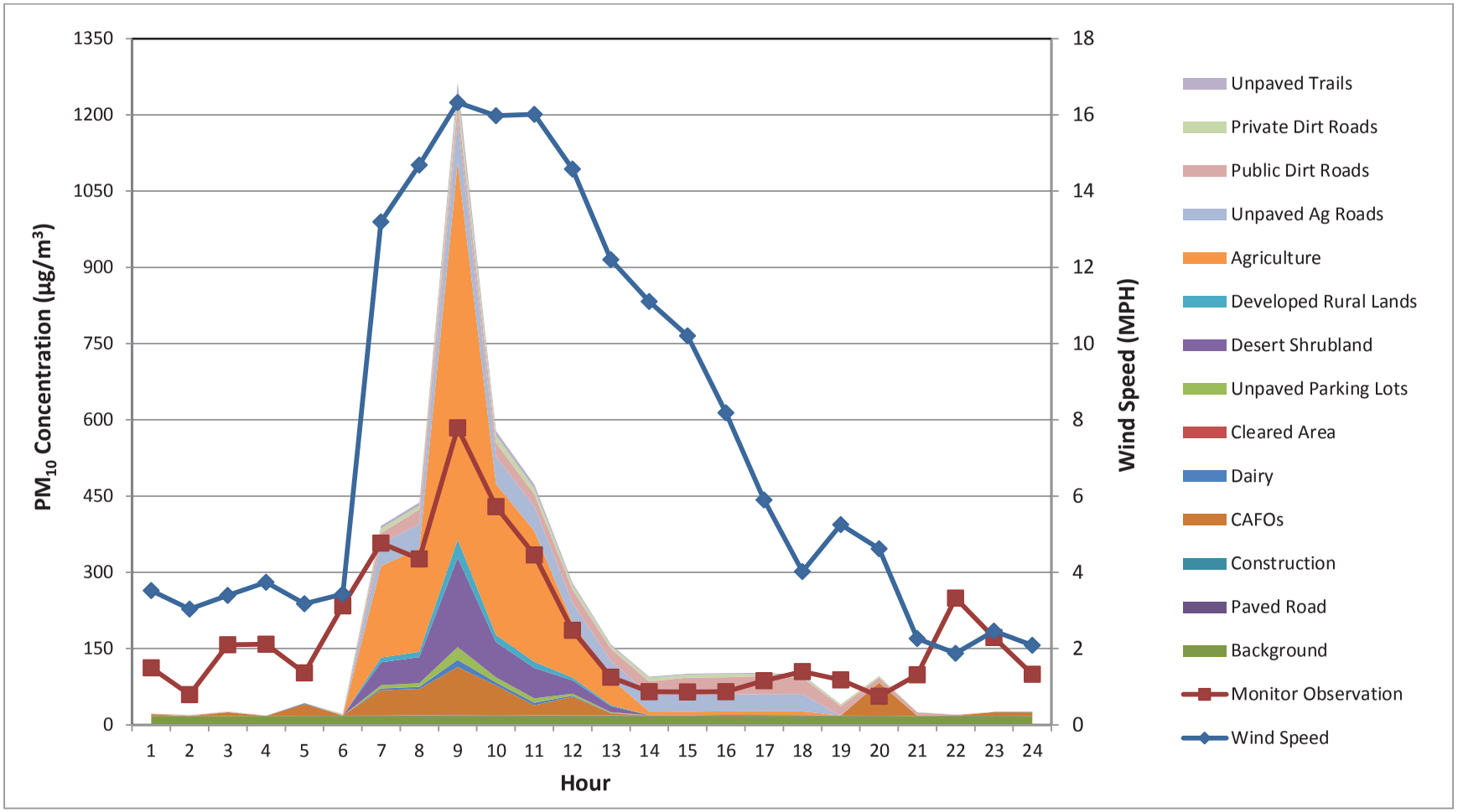


Figure 3-10. Projected 2018 High Wind Design Day Source Contributions

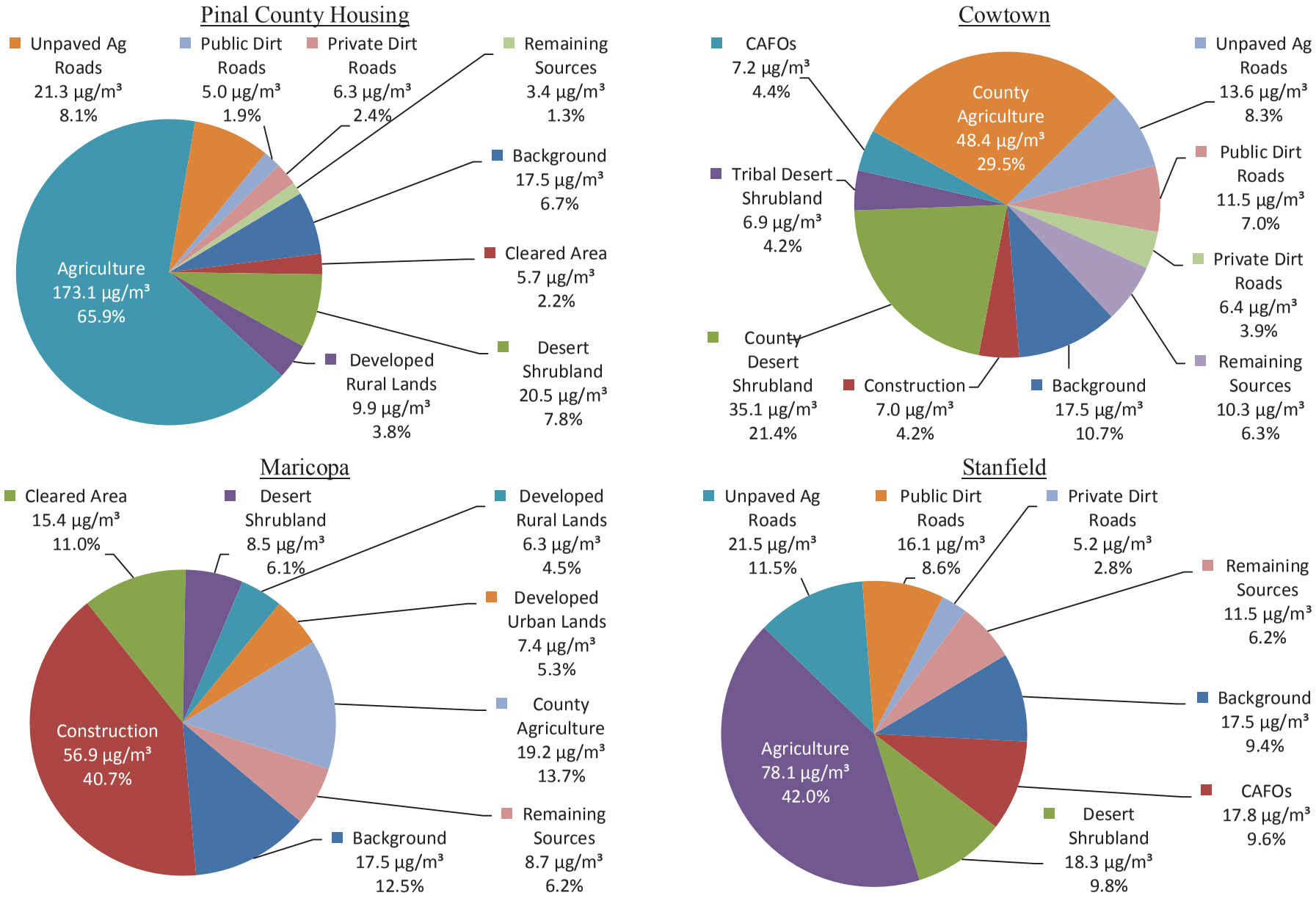


Exhibit CI High Wind Design Day Example Calculation

High Wind Design Day Sample Calculation

Assume calculation of the hourly windblown emissions from a 50 acre (202,343 m^2) cotton field located 1.3 miles directly upwind of the Pinal County Housing (PCH) monitor during harvesting season for a single hour averaging 22 mph wind speed. This is the fourth consecutive hour of high winds (i.e. >12mph) for this wind event and one hour following the maximum measured concentration for this wind event at the PCH monitor. The harvesting season is assumed to have fully disturbed soil, so use of Equation 1 on page 114 of Appendix B is appropriate (Note: For those lands determined to be partially disturbed, Equations 1 and 2 on pages 114 and 115 of Appendix B would be employed and the area utilized in each equation would be the product of the area of the parcel and the disturbed fraction and stable fraction of the land of interest, respectively).

$$E_{sj} = F_{EFAdjustment} \times A \times EF_{Disturbed\ bin} \times V'$$

where:

Esj = suspended PM_{10} in gram/sec for hour j,

$F_{EFAdjustment}$ = the emission adjustment factor for diminished particle supply (detailed in Appendix B, Exhibit BVII),

A = the area of each crop's land parcel, in m^2,

$EF_{Disturbed,bin}$ = the windblown dust emission factor developed for disturbed soil for that wind speed bin, g/m^2-sec for hour j (detailed in Appendix B, Exhibit BV), and

V' = vegetative cover for crop specific, presented in Appendix B, Table 3-48.

Table CI-1. Values used for Example Windblown Dust Calculation

Variable	Value	Units	Source
$F_{EFAdjustment}$	51	%	Exhibit BVII, Table BVII-4
A	202,343	m^2	Given in assumptions (area of the field)
$EF_{Disturbed,bin}$	4.27E-04	g/m^2-s	Exhibit BV, Table BV-4
V'	0.7	unitless	Appendix B, Table 3-48

Using the values presented in Table CI-1 and the equation above, we can calculate windblown emissions from the cotton field during this single hour of high wind as:

$$E_{sj} = 0.51 \times 202{,}343\ m^2 \times 0.000427 \frac{g}{m^2 - s} \times 0.7 = 30.8 \frac{g}{s} \times 3600 \frac{s}{hr} \div 453.6 \frac{g}{lb} = 244 \frac{lb}{hr}$$

The emissions produced within that hour are 245 lbs. This can then be modeled as monitor impacts by dividing by the straight-line distance to the monitor (1.3 miles). This results in a monitor impact of 188 lb/mile.

If this impact was assumed to occur on the 2008 PCH high wind design day and only assumed to occur for this one hour, we can normalize the field's impact to the monitor by dividing the individual cotton field's impact calculated above by the total emission impacts on the monitor for that day (25,288 lb/mile; calculated as the sum of the hourly total impacts presented in Section 3.3 of Appendix C, Table 3-1) multiplied by the non-background monitor 24-hour average (247.4 $\mu g/m^3$)[28]. This results in a 24-hr average impact from this single cotton field on the monitor of 1.8 $\mu g/m^3$ for the PCH design day.

[28] 247.4 $\mu g/m^3$ is calculated as the design day concentration (264.9 $\mu g/m^3$) minus the calculated non-anthropogenic background on high risk days (17.5 $\mu g/m^3$, per Section 3.2 of Appendix C).

ADEQ
Arizona Department of Environmental Quality

Appendix D

Pinal County PM_{10} Nonattainment Area 2018 Attainment Demonstration and Controlled Emissions Inventories

Air Quality Division
December 21, 2015 Final

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Glossary of Agencies

ADEQ	Arizona Department of Environmental Quality
EPA	United States Environmental Protection Agency
FHWA	United States Department of Transportation, Federal Highway Administration
MAG	Maricopa Association of Governments
PCAQCD	Pinal County Air Quality Control District
SCMPO	Sun Corridor Metropolitan Planning Organization
SJVAPCD	San Joaquin Valley Air Pollution Control District

Glossary of Terms

$\mu g/m^3$	Micrograms per cubic meter
A.A.C.	Arizona Administrative Code
ADT	Average Daily Traffic (equivalent to average daily one-way vehicle trips)
BMPs	Best Management Practices
C.F.R.	Code of Federal Regulations
CWT	Cowtown monitor
EI	Emissions Inventory
MC	Maricopa monitor
MVEB	Motor Vehicle Emissions Budget
NA	Nonattainment Area (herein, the West Pinal PM_{10} NA)
NAAQS	National Ambient Air Quality Standards (herein, the 1987 primary and secondary 24-hour PM_{10} NAAQS)
PCH	Pinal County Housing or Eleven Mile Corner monitor
PM_{10}	Particulate matter with diameters up to, but no more than, 10 microns
RFP	Reasonable Further Progress
SIP	State Implementation Plan (or, herein, a 2015 proposal to revise the parts of the Arizona SIP which apply to the West Pinal PM_{10} NA)
STF	Stanfield monitor
TPY	Tons Per Year (herein, “tons” are U.S. short tons)
VMT	Vehicle Miles Traveled

D1 Introduction

This document is an appendix to a proposed revision to the Arizona State Implementation Plan (SIP). Unless otherwise noted, references to other appendices (e.g. "Appendix B") should be understood to describe other appendices to the same proposed SIP revision, *not* appendices to this document (which are instead referred to as "Exhibits").

The proposed SIP revision applies to the West Pinal PM_{10} Nonattainment Area (NA), as designated by the U.S. Environmental Protection Agency (EPA) on July 2, 2012 (and as defined in 40 C.F.R. §81.303). This document discusses the technical methodologies and rationales whose results support claims made in that proposed revision. Previous appendices discuss the principles used to quantify and account for the PM_{10} baseline in the NA. The essential results of those appendices are reviewed in Section D2. The foci of this appendix are:

- the technical analysis used as evidence that the controls in the proposed revision will bring the NA into attainment of the 1987 primary and secondary 24-hour PM_{10} National Ambient Air Quality Standards (NAAQS),
- the accounting choices underlying the motor vehicle PM_{10} emissions budget (MVEB) for on-road vehicles and road construction), and
- the technical analysis used as evidence that the controls in the proposed revision will satisfy the reasonable further progress (RFP) and contingency measure requirements for the NA.

These subjects are discussed in Sections D3, D4, and D5, respectively. For readability, some portions of this document omit routine calculation details or large datasets. Some details can be found in the other appendices, in the references listed in Section D6, or else in the exhibits. Additional details are available from the SIP Section of the Arizona Department of Environmental Quality (ADEQ)'s Air Quality Division, upon request.

D2 Base Scenario

The West Pinal PM_{10} NA strategy for attaining the NAAQS by 2018 was formulated based on an analysis of PM_{10} emissions in 2008, and projections of what those emissions would look like in 2018 without intervention. Days representing the PM_{10} problem around each exceeding monitor (design days) were modeled to identify which sources of PM_{10} emissions contribute the most to the exceedances on each design day. Each design day is classified as either a stagnation day (in which the exceedance was related to poor mixing conditions, allowing dust to accumulate) or a high-wind day (in which the exceedance was related to the generation of large amounts of windblown dust). The design day's meteorological classification determines which PM_{10} sources are considered and how their emissions are modeled. Three monitors were considered for stagnation days: the Cowtown monitor, abbreviated CWT; the Pinal County Housing monitor, sometimes called the Eleven Mile Corner monitor, abbreviated PCH; and the Stanfield monitor, abbreviated STF. For high-wind days, the same three monitors were considered, as well as the Maricopa monitor, abbreviated MC.

Appendix B describes the methodology by which the annual, NA-wide EI was developed for 2008 and projected to 2018. It also details the method used to identify a spatial extent to model for each design day (the modeling domain) and how the annual, nonattainment-area-wide EI was temporally and spatially allocated to facilitate modeling for each design day. A summary of the 2018 EIs, itemized by source type, is provided in Table D2-1.

Appendix C explains how each design day EI was modeled to determine the resulting concentrations at the relevant monitor. In the case of high-wind modeling, the hourly emission total from each source in the appropriate domain was weighted by the source's proximity to the relevant monitor. The 24-hour average of these relative impacts, summed over all sources in the appropriate domains (*i.e.*, local sources), is listed for each base scenario high wind design day in Table D2-2.

For stagnation modeling, each emissions source in the appropriate domain was run through the AerMOD dispersion model, whose raw output was the concentration of PM_{10} at the monitor attributable to each local source for a given hour. These values were adjusted to approximate the persistence of certain particles (those under 9 µm in diameter) in the stagnant air from one hour to the next. The 24-hour average of the adjusted impacts at the monitor, summed over local sources, is included in Table D2-2.

However, these models only address the impact of local emissions sources in the area immediately surrounding the monitor. The impact of other, regional sources was estimated for both high-wind and stagnation days. Using these background concentrations, B, ADEQ calibrated the models using the relationship

$$M = B + cL$$

where M is the concentration at the monitor, L is the modeled impact of local sources, and c is the scaling factor used to calibrate the model for each design day. In order to determine the

Table D2-1. Summary of 2018 Base Scenario Inventories

Source Category		Annual NA-Wide Emissions in Tons Per Year (TPY)	Emissions for Modeling Domains in Pounds per Day (lbs/day)						
			Stagnation Design Days			High-Wind Design Days			
			CWT	PCH	STF	CWT	MC	PCH	STF
Windblown Dust	Developed Urban	248.1	-	-	-	31.1	896.9	155.1	-
	Developed Rural	1,959.7	-	-	-	257.9	1,307.2	1,257.6	161.1
	Unpaved Roads	4,653.0	-	-	-	1,018.9	917.3	4,027.0	521.3
	Cleared Areas	457.0	-	-	-	141.8	2,317.1	1,590.5	19.7
	Construction	1,831.1	-	-	-	905.5	8,175.8	-	-
	Dairies	449.6	-	-	-	-	-	-	126.0
	CAFOs	155.2	-	-	-	-	-	-	463.6
	Desert Shrubland	38,276.7	-	-	-	3,881.5	1,063.1	4,600.3	967.2
	Agriculture	19,510.1	-	-	-	3,905.9	4,899.2	31,617.4	4,618.7
	Other	4,243.9	-	-	-	0.5	185.6	-	-
Activity-Based Emissions	Agriculture	2,853.2	366.0	379.2	879.6	1,110.8	292.8	954.0	1,058.4
	CAFOs	1,620.6	3,233.5	-	3,347.8	3,233.5	-	-	4,121.1
	Paved Roads	1,408.0	501.3	112.5	125.5	510.0	591.8	71.3	125.2
	Unpaved Roads	45,105.3[1]	12,352.3	3,923.6	12,735.7	11,241.5	4,389.9	6,917.0	11,842.7
	Fuel Combustion	34.9	-	-	-	-	-	2.2	0.4
	Fires	22.2	6.7	2.0	7.4	7.2	3.0	3.5	6.8
	Open Burning	16.8	1.7	0.1	0.2	2.2	13.7	0.4	0.2
	Nonroad	144.4	16.8	1.2	2.4	20.4	130.8	3.6	2.4
	Railroad	45.4	15.1	-	-	15.5	15.6	-	-
	Construction	8,499.8	3,651.0	1,130.7	2,348.0	-	3,667.0	935.0	14.0
	Dairies	184.0	-	25.5	141.0	-	-	-	187.7
	Point Sources	781.3	560.8	24.3	7.1	560.2	-	24.3	7.1
	Unpaved Parking	251.5	99.2	57.6	45.0	112.1	48.3	101.5	43.3
Total		132,751.8	20,804.5	5,656.7	19,639.7	26,956.4	28,915.1	52,260.6	24,287.0

[1] Note that emissions from unpaved test tracks at permitted vehicle testing facilities are not included here, but instead in the annual total for Point Sources. However, test track emissions are modeled just like other unpaved road emissions. Therefore, in design day inventories, they are included in Unpaved Roads.

value of *c* for a given design day, ADEQ substituted the modeled value of *L* for that design day in 2008, substituted the appropriate background value (either the high-wind or the stagnation value), and substituted the actual 24-hour average concentration observed at the relevant monitor on the appropriate day in 2008 for *M*. The approximate values of the resulting scaling factors are shown in Table D2-2, and were reused for 2018 modeling. For example, the Cowtown stagnation design day in 2008 yields

$$244.5\ \mu g/m^3 = 11.5\ \mu g/m^3 + c \cdot 849.6\ \mu g/m^3$$

so that $c \approx 27.42\%$. When interpreting the model results for the 2018 base scenario in Cowtown, that value of *c* is used:

$$M\ \mu g/m^3 = 11.5\ \mu g/m^3 + 27.42\% \cdot 645.1\ \mu g/m^3$$

so that $M \approx 188.4$. The same background concentrations and scaling factors are used again to interpret the attainment modeling results in Section D3.3.

Table D2-2. Summary of Base Scenario Modeling Results

Year	Design day		Modeled impact of local sources[2]	Scaling factor[2]	Local impact only (µg/m³)	Background concentration (µg/m³)	Concentration at the monitor (µg/m³)	
2008	Stagnation	CWT	849.6	27.4%	233.0	11.5	244.5	Monitor observations
		PCH	87.5	190.3%	166.5		178.0	
		STF	64.6	233.1%	150.5		162.0	
	High-Wind	CWT	289.5	52.1%	150.8	17.5	168.3	
		MC	456.5	31.1%	141.9		159.4	
		PCH	1,053.7	23.5%	247.4		264.9	
		STF	214.1	75.2%	161.1		178.6	
2018	Stagnation	CWT	645.1	27.4%	176.9	11.5	188.4	Modeled projections
		PCH	88.3	190.3%	168.1		179.6	
		STF	79.9	233.1%	186.2		197.7	
	High-Wind	CWT	280.7	52.1%	146.2	17.5	163.7	
		MC	394.0	31.1%	122.5		140.0	
		PCH	1,044.3	23.5%	245.2		262.7	
		STF	224.0	75.2%	168.5		186.0	

[2] Because of the different methods used to model the high-wind and stagnation scenarios, the units for these values vary. High-wind day local impacts, before scaling, are in terms of (lbs/hr)/mile, whereas stagnation impacts are in µg/m³. In either case, the resulting scaled impact is in µg/m³. Therefore, the empirically-derived scaling factor is unitless for stagnation modeling, but carries the unit (µg/m³)/([lbs/hr]/mile) for high-wind modeling.

D3 Attainment Control Measures

The controls discussed in Sections D3.1.1, D3.1.3, and D3.1.4 result in significant emissions reductions, which are summarized in Table D3-1. Incorporating these reductions into the 2018 modeling scenarios results in lower modeled concentrations – as described in Section D3.3—which indicate that the NA will attain the PM_{10} standard in 2018. Reductions due to controls implemented by commercial dairy operators, described in Section D3.1.2, are reserved for contingency measures (see Section D5.2).

Table D3-1. Summary of Attainment Measure Reductions

A.A.C. Rule #	Controlled Dust Sources	Implementation date	NA-Wide 2018 Reductions (TPY)
R18-2-610.03	Harvesting and Tilling	January 1, 2016	13,376.2
R18-2-610.03	Unpaved Agricultural Roads	January 1, 2016	8,046.5
R18-2-611.03	Beef Cattle Feedlots	January 1, 2016	281.3
R18-2-612.01	Canal Roads	January 1, 2016	722.3
Total			22,426.3

D3.1 Agricultural Best Management Practices

The controls, or best management practices (BMPs) codified in R18-2-610, -611, and -612 are generally organized into menus of options for each PM_{10} emissions source, from which the operator selects which controls to implement. Whenever possible, ADEQ relied on surveys of operators to determine which of the available controls would most likely be implemented.

As a part of the overall control strategy, ADEQ and PCAQCD will alert the regulated community when forecasters identify a high risk of PM_{10} problems in the NA, giving the operators sufficient warning to implement more stringent controls in order to avert a PM_{10} exceedance. Certain provisions require the high-risk-day controls to be implemented both on the high risk day and on the day preceding it, to reduce the surface dust available for the following day—others require the enhanced controls only on the high-risk day itself. The required BMPs for high risk days are organized as shortlists of the most effective BMPs from the menus that the operator had previously been choosing from. If that operator's every-day BMP option happens to be on the short list, then no further action may be required. Otherwise, the operator will have to select a BMP from the short menu to complement the every-day BMP already in place.

In determining how frequently these high-risk-day BMPs would be implemented, PCAQCD evaluated the relevant data that would have been available to them each day in 2011-2013[3]. Using the current forecasting methodology, 106 high risk days were identified for windblown dust generation, so about 35 high-wind days per year are expected to be forecast as high risk. For stagnation conditions, an additional 10 days are expected to be forecast as high risk each

[3] Email correspondence between ADEQ and Scott Dibiase of Pinal County on 2/4/2014 and 5/28/2015.

year, for a total of 45 expected high-risk forecast days per year. Recall that the design days collectively cover 2 calendar days exemplifying stagnation conditions in the NA and 4 calendar days exemplifying high winds in the NA. Because these are precisely the types of days that the high-risk forecast seeks to identify, ADEQ assumed that the high-risk-day BMPs would be in place for each design day in the attainment scenario.

D3.1.1 Requirements for Commercial Crop Operations

R18-2-610.03 establishes the rules targeted at controlling dust generation from crop operations within the Pinal County PM_{10} Nonattainment Area. Controls adopted under the general permit covered in this rule span the following operations on a commercial crop farm:

- Tillage (R18-2-610.03(B)(1)),
- Ground Operations and Harvest (R18-2-610.03(B)(2)),
- Noncropland (R18-2-610.03(B)(3)),
- Commercial Farm Roads (R18-2-610.03(B)(4)),
- Cropland (R18-2-610.03(B)(5)), and
- Earthmoving Activities (R18-2-610.03(B)(6))

For these operations, a commercial farmer is required to implement controls from a menu of ADEQ approved measures which will reduce activity related and/or windblown PM_{10} emissions on all days of the year. For days forecasted as high risk, commercial crop farmers must implement controls from a more restrictive menu of options to ensure increased PM_{10} emission reductions are realized.

This section describes the methods by which emission reductions were estimated in response to the implementation of R18-2-610.03. ADEQ utilized emission reductions from control of the above listed operations towards modeling attainment in the year 2018.

D3.1.1.1 Crop Operation Best Management Practices Surveys

In order to estimate commercial crop farm emission reductions associated with the implementation of this rule, ADEQ required an understanding of which BMPs a commercial crop farmer would be most likely to implement for each operation. With the help of the Agricultural Best Management Practices Committee (Ag BMP Committee), ADEQ surveyed Pinal County crop farmers to determine the likelihood of individual BMP implementation.

The distributed survey requested crop specific control measure implementation feedback from farmers in the format listed in Exhibit DI1. The survey requests feedback on which control measure/s each farmer expects to implement for each operation type. Individual surveys were requested from each farmer for every crop grown on their property. Surveys were distributed to farmers on the Pinal County Farm Bureau distribution list by the Ag BMP Committee. The crop surveys were initially distributed to farmers in the Pinal County PM_{10} nonattainment area via email on April 3, 2014. A follow-up reminder email was sent on May 2, 2014. Additional outreach

was conducted through the Pinal County irrigation districts. Surveys were either made available directly to growers or an electronic copy was provided to irrigation district managers for additional disbursement to their respective members. Compiled survey results for all farmers were received electronically by ADEQ from the Ag BMP Committee on May 19th, 2014. ADEQ later verified individual survey results against the compiled survey results provided by the Ag BMP Committee to ensure quality.

Responses to the agricultural crop survey were received from 22 farmers in the Pinal County nonattainment area. Responses from these 22 farmers covered a total of 51,155 acres of cropland. Utilizing the PCAQCD and ADEQ developed nonattainment area land use map, ADEQ estimates that the total acreage of agricultural cropland in the nonattainment area is 249,039 acres. Therefore, the survey responses represent agricultural land acreage that covers 21% of the total agricultural acreage in the nonattainment area. ADEQ then reviewed the responses of each farmer to determine if the information provided would comply with the requirements for at least one of the operations listed above for any crop. Those responses that met the requirements for any single operation were utilized in the calculation of crop specific control efficiency for that crop. This reduced the survey response acreage from 51,155 acres due to the removal of nonviable data (*i.e.*, data that did not comply with a subsection of the rule). ADEQ presents an overview of viable data by major crop type in Table D3-2. The acreage reported in Table D3-2 represents the acreage used for each crop when calculating tillage and harvesting control efficiencies by crop.

Table D3-2. Survey Representativeness for Major Crops Cultivated in the Pinal County PM10 Nonattainment Area

Crop	Total Acreage Surveyed (Tillage)	Total Acreage Surveyed (Harvest)	NAA Crop Acreage**	Percentage of NAA Acreage Surveyed (Tillage)	Percentage of NAA Acreage Surveyed (Harvest)
Alfalfa	7,422	13,683	80,116	9%	17%
Cotton	9,286	8,223	92,554	10%	9%
Vegetables	89	80	12,067	1%	1%
Hay*	1,000	1,193	3,561	28%	33%
Corn & Grain	8,742	9,281	53,221	16%	17%

*Assumed to be equivalent to non-alfalfa forage
**Nonattainment crop acreage is estimated as the total acreage of ADEQ/PCAQCD land use map crop acreage multiplied by the percentage of each crop in the county as determined from the 2007 USDA Agricultural Census.

The 2007 USDA Agricultural Census reported a total of 480 cropland farms in Pinal County in 2007[4]. ADEQ estimates that 467 of those farms occur in the nonattainment area. This estimate was derived by multiplying the total number of cropland farms by the ratio of crop acreage reported for the county and dividing by the total crop acreage derived from ADEQ and PCAQCD

[4] See Arizona Table 1 of (USDA, 2012)

land use maps for the nonattainment area (*e.g.*, 476 = 480 * [249,039 / 256,032]). 22 farmers reported results for the agricultural survey, indicating a 5% response rate by farm number (*e.g.*, 5% = 22 / 467). ADEQ then reviewed the responses of each farmer to determine if their responses would comply with the requirements of at least one of the operations listed above for any crop. Based on this review, 19 of 22 farmers submitted viable data towards the calculation of control efficiencies for an operation, for at least one crop. Assuming survey respondents do not own more than one farm in the nonattainment area, this results in a calculated, viable response rate of 4% (*e.g.*, 4% = 19 / 467).

Based on the survey responsiveness metrics presented above ADEQ concluded that the survey results provide adequate representation of the controls that are likely to occur in Pinal County. While the survey responses appear to have originated primarily from large farmers in the region (responses originated from only 5% of the farms, but constitute 21% of the crop acreage in the region), the percentage of crop land covered from survey responses indicates a robust sample.

D3.1.1.2 Tillage Control Efficiency Calculation

Controls implemented on tillage operations (R18-2-610.03(B)(1)) were utilized for attainment demonstration of the NAAQS for the year 2018. Crop specific control efficiencies were estimated for tillage on non-high risk forecast days and high risk forecast days. Crop surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey which provided responses adequate to meet the requirements of R18-2-610.03(B)(1) for a given crop was utilized to estimate the distribution of tillage controls that could be expected for a given crop. Survey responses for tillage operation control were organized by crop type. For each crop type only survey results that met the rule requirements were utilized. Where farmers reported a number of controls to be implemented that exceeded the number of controls required by the rule, the farmer was given credit for that control which had the highest control efficiency based on efficiencies researched from previous PM_{10} plans or studies (a list of utilized control efficiencies and their references are presented in Exhibit DI2). In those instances where control efficiencies were not identified for a given crop, the lowest reported efficiency researched for that control from any crop was assumed adequate, in order to assure a conservative emission reduction estimate.

Average non-high risk day crop specific activity related tillage control efficiency was calculated by weighting individual farmer control efficiencies (assigned using the methods outlined in the preceding paragraph) by the acreage of cropland reported in cultivation by the farmer using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will implement ‘Combining Tractor Operations’ (43% control efficiency for tillage activities) as a control for cotton tillage on his/her 150 acres of cultivated cotton.
- Farmer B responds that he/she will implement ‘Equipment Modification’ (50% control efficiency for tillage activities) as a control for cotton tillage on his/her 500 acres of cultivated cotton.

- Farmer C responds that he/she will implement 'Planting Based on Soil Moisture' (30% control efficiency for tillage activities) as a control for cotton tillage on his/her 293 acres of cultivated cotton.

Based on this information we can calculate an average non-high risk day cotton tillage control efficiency utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times A_a) + (CE_b \times A_b) + (CE_c \times A_c)}{A_a + A_b + A_c}$$

which becomes

$$CE_{avg} = \frac{(43\% \times 150\ acres) + (50\% \times 500\ acres) + (30\% \times 293\ acres)}{150\ acres + 500\ acres + 293\ acres} = 43\%$$

where

CE_{avg} = average crop specific activity emission control efficiency (%),

CE_x = the crop specific activity emission control efficiency assigned to farmer x given his/her survey response (where x = A, B, C…), and

A_x = the acreage of cultivated crop reported by farmer x (where x = A, B, C…).

Acceptable non-high risk day BMPs for tillage emission control are outlined in R18-2-610.03(B)(1)(a). Some of these controls reduce not only activity related emissions, but also work to stabilize the soil surface or provide ground cover for the reduction of windblown dust emissions during tillage season. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity related emission control efficiencies were replaced by researched windblown dust reported efficiencies.

Additionally, R18-2-610.03(B)(1)(b) outlines those controls which are acceptable for implementation during high risk forecasted days. Utilizing this list of BMPs and the methods described above, ADEQ estimated crop specific average tillage control efficiencies for activity emissions and windblown dust emissions. High risk control efficiencies were applied to calculated design day tillage activity emissions and windblown emissions under the assumption that all design days would be forecasted as high risk[5]. For annual emission calculations, ADEQ relied on estimates of the number of annual days assumed to qualify as high risk for the period 2011-2013 provided by PCAQCD and calculated a weighted crop specific annual control efficiency assuming 45 days forecasted for high risk and the remainder of days forecasted as non-high risk. While R18-2-610.03(A) requires implementation of high risk BMPs on the day prior to a forecasted high risk day, ADEQ conservatively only took credit for the 45 days forecasted as high risk and not the preceding days (*i.e.*, up to 90 days annually) when calculating the weighted annual tillage control efficiencies. Furthermore, as the tillage season for any given crop only occurs during a portion of the year, the crop specific annual average windblown control efficiency was only applied to the proportion of the year that a given crop was reported to experience tillage activities (presented in Exhibit DI3). This was determined from the crop calendar provided by PCAQCD (Appendix B).

[5] See Section D3.1.

Additional Assumptions/Notes:

- Farmers who only chose multi-year crop as a control for a given crop were excluded from control efficiency calculations as the emissions reductions associated with this control are already inherently taken into account through emission rate calculations for those crops through the use of the vegetative factor.
- Through research, ADEQ could not identify an adequate set of control efficiencies for forage. In the absence of a set of control efficiencies for this crop, alfalfa control efficiencies were utilized since alfalfa is considered a forage crop and is also the second most abundantly harvested crop in the county as reported in (USDA, 2012).

D3.1.1.3 Ground Operations and Harvest Control Efficiency Calculation

Controls implemented on ground operations and harvest (R18-2-610.03(B)(2), henceforth referred to as harvest) were credited towards attainment demonstration of the NAAQS for the year 2018. Crop specific control efficiencies were estimated for harvest on non-high risk forecast days and high risk forecast days. Crop surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey which provided responses adequate to meet the requirements of R18-2-610.03(B)(2) for a given crop was utilized in the estimation of harvest controls distribution that could be expected for a given crop. Survey responses for harvest operation control were organized by crop type. For each crop type only survey results that met the rule requirements were utilized. Where farmers reported a number of controls to be implemented that exceeded the number required by the rule, the farmer was given credit for that control which had the highest control efficiency based on efficiencies researched from previous PM_{10} plans or studies (a list of utilized control efficiencies and their references are presented in Exhibit DI2). In those instances where control efficiencies could not be identified for a given crop, the lowest reported efficiency researched for that control from any reported crop was assumed adequate in order to assure a conservative emission reduction estimate.

Average non-high risk day crop specific activity related harvest control efficiency was calculated by weighting individual farmer efficiencies (assigned using the methods outlined in the preceding paragraph) by the acreage of cropland reported in cultivation by the farmer using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will implement ‘Combining Tractor Operations’ (43% control efficiency for harvest activities) as a control for cotton harvest on his/her 150 acres of cultivated cotton.
- Farmer B responds that he/she will implement ‘Equipment Modification’ (50% control efficiency for harvest activities) as a control for cotton harvest on his/her 500 acres of cultivated cotton.

- Farmer C responds that he/she will implement 'Chemical Irrigation' (9% control efficiency for harvest activities) as a control for cotton harvest on his/her 293 acres of cultivated cotton.

Based on this information we can calculate an average non-high risk day cotton harvest control efficiency utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times A_a) + (CE_b \times A_b) + (CE_c \times A_c)}{A_a + A_b + A_c}$$

which becomes

$$CE_{avg} = \frac{(43\% \times 150\ acres) + (50\% \times 500\ acres) + (9\% \times 293\ acres)}{150\ acres + 500\ acres + 293\ acres} = 36\%$$

where

CE_{avg} = average crop specific activity emission control efficiency (%),

CE_x = the crop specific activity emission control efficiency assigned to farmer x given his/her survey response (where x = A, B, C…), and

A_x = the acreage of cultivated crop reported by farmer x (where x = A, B, C…).

Acceptable non-high risk day BMPs for harvest emission control are outlined in R18-2-610.03(B)(2)(a). Some of these controls reduce not only activity emissions, but also work to stabilize the soil surface or provide ground cover to reduce windblown dust emissions during harvest season. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity emission control efficiencies were replaced by windblown efficiencies.

Additionally, R18-2-610.03(B)(2)(b) outlines those controls which are required for implementation during high risk forecast days. Utilizing this list of BMPs and the methods described above, ADEQ estimated crop specific average harvest control efficiencies for activity emissions and windblown emissions. High risk control efficiencies were applied to design day harvest activity emissions and windblown emissions under the assumption that all design days would be forecast as high risk.[6] For annual emission calculations, ADEQ relied on estimates of the number of annual days assumed to qualify as high risk for the period 2011-2013 and calculated a weighted crop specific annual control efficiency assuming 45 high risk forecast days, with the remainder of days forecast as non-high risk. While R18-2-610.03(A) requires implementation of high risk BMPs on the day prior to a forecasted high risk day, ADEQ conservatively only took credit for 45 high risk days and not the preceding days (*i.e.*, up to 90 days annually) when calculating the weighted annual harvest control efficiencies. Furthermore, as the harvest season for any given crop only occurs during a portion of the year, the crop specific annual average windblown control efficiency was only applied to the proportion of the year that a given crop was reported to experience harvest activities (presented in Exhibit DI3). This was determined from the crop calendar provided by PCAQCD.

[6] See Section D3.1.

Additional Assumptions/Notes:

- Farmers who only chose multi-year crop as a control for a given crop were excluded from control efficiency calculations as the emissions reductions associated with this control are already inherently taken into account through emission rate calculations for those crops through the use of the vegetative factor.
- Through research, ADEQ could not identify an adequate set of control efficiencies for forage. In the absence of a set of control efficiencies for this crop, alfalfa control efficiencies were utilized since alfalfa is considered a forage crop and is also the second most abundantly harvested crop in the county as reported in (USDA, 2012).
- 'Conservation Tillage' and 'Reduced Tillage System' BMPs were assumed to qualify as viable BMPs when reviewing surveys for crop specific harvest control responses. These BMPs were assigned an activity related control efficiency of 0% since they do not reduce activity related harvest emissions, but were assigned non-zero control efficiencies for windblown dust since their use increases ground cover. The windblown dust control efficiencies for these BMPs were assumed to be equal to those experienced during the tillage season.

D3.1.1.4 Noncropland Control Efficiency Calculation

Noncropland was never explicitly defined during the creation of the Pinal County land use map. As such, emission reductions associated with the adoption of R18-2-610.03(B)(3) could not be quantified.

D3.1.1.5 Commercial Farm Road Control Efficiency Calculation

Controls implemented on commercial farm roads (R18-2-610.03(B)(4)) were utilized in the demonstration of attainment towards the NAAQS for the year 2018. Control efficiencies were estimated for non-high risk forecasted days and high risk forecasted days. Agricultural BMP crop surveys were used as guidance to determine the percentage of farmers implementing any given BMP. Each survey which provided responses adequate to meet the requirements of R18-2-610.03(B)(4) was utilized in the determination of commercial farm road control distribution that could be expected on a farm. Where farmers reported a number of controls to be implemented that exceeded the number of controls required by the rule, the farmer was given credit for that control which had the highest efficiency based on efficiencies researched from previous PM_{10} plans or studies (a list of utilized control efficiencies and their references are presented in Exhibit DI2).

Average non-high risk day commercial farm road activity related control efficiency was calculated by weighting individual farmer activity control efficiencies (assigned using the methods outlined in the preceding paragraph) by the total miles of unpaved road reported by the farmer using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will implement 'Access Restriction' (2% control efficiency) as a control on his/her 10 miles of unpaved roads.
- Farmer B responds that he/she will implement 'Reduced Vehicle Speed' (26% control efficiency) as a control on his/her 12.5 miles of unpaved roads.
- Farmer C responds that he/she will implement 'Aggregate Cover' (46% control efficiency) as a control for his/her 58 miles on unpaved roads.

Based on this information we can calculate an average non-high risk day commercial farm road control efficiency utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times L_a) + (CE_b \times L_b) + (CE_c \times L_c)}{L_a + L_b + L_c}$$

which becomes

$$CE_{avg} = \frac{(2\% \times 10\ miles) + (26\% \times 12.5\ miles) + (46\% \times 58\ miles)}{10\ miles + 12.5\ miles + 58\ miles} = 37\%$$

where

CE_{avg} = average activity emission control efficiency (%),

CE_x = the activity emission control efficiency assigned to farmer x given his/her survey response (where x = A, B, C…), and

L_x = the mileage of unpaved roads reported by farmer x (where x = A, B, C…).

Acceptable non-high risk day BMPs for commercial farm road control are outlined in R18-2-610.03(B)(4)(a) Some of these controls reduce not only activity emissions, but also work to stabilize the soil surface or provide ground cover and reduce windblown dust emissions. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity emission control efficiencies were replaced by windblown dust efficiencies.

Additionally, R18-2-610.03(B)(4)(b) outlines those controls required for implementation during high risk forecast days. Utilizing this list of BMPs and the methods described above, ADEQ estimated commercial farm road control efficiencies for activity emissions and windblown dust emissions. However, after calculation of average control efficiencies for non-high risk and high risk days, ADEQ decided to assume all design days and annual emissions would only experience non-high risk day controls. While this was a conservative approach, underestimating emission reductions, high risk day control efficiency is only slightly higher (0.5%) than the non-high risk day control efficiency for activity related emissions on commercial farm roads and equivalent for non-high risk days and high risk days for windblown dust emissions. Therefore, assuming design day and annual reductions will not benefit from high risk day controls does not significantly affect estimated emission reductions.

Additional Assumptions/Notes:

- For the survey initially created by ADEQ the 'Organic Material Cover' BMP was inadvertently excluded. As no data was received for this BMP, it was not included in the calculation of average control efficiencies.
- Farmers who chose 'Track-out Control Systems' as a BMP also chose other BMPs that were expected to have higher efficiency; therefore, ADEQ did not perform calculations to try to determine 'Track-out Control System' efficiency.

D3.1.1.6 Cropland Control Efficiency Calculation

Cropland refers to those lands on a commercial farm that are suitable for crop production but are either: 1) used as a turn-row, 2) fallow, or 3) between the harvesting and planting seasons. As little activity occurs on these lands, controls target the reduction of windblown emissions through ground cover or stabilization.

Controls implemented on cropland (R18-2-610.03(B)(5)) were utilized to demonstrate attainment of the NAAQS for the year 2018. Crop and fallow land specific control efficiencies were estimated for cropland on non-high risk forecast days and high risk forecast days. Crop surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey which provided responses adequate to meet the requirements of R18-2-610.03(B)(5) for a given crop or fallow land was utilized to determine the distribution of cropland controls that could be expected for that given crop or fallow land. Survey responses for cropland control were organized by crop type or fallow land. For each crop type, only survey results that met the rule requirements were utilized. Where farmers reported a number of controls to be implemented that exceeded the number of controls required by the rule (two), the farmer was given credit for those two controls which had the highest control efficiency and met the rule requirements (a list of utilized control efficiencies and their references are presented in Exhibit DI2). In those instances where control efficiencies could not be identified for a given crop, the lowest reported efficiency researched for that control from any reported crop was assumed adequate in order to assure conservative emission reduction estimates.

Average non-high risk day crop/fallow land specific windblown dust cropland control efficiency was calculated by weighting individual farm efficiencies (assigned using the methods outlined in the preceding paragraph) by the acreage of cropland reported in cultivation by the farmer using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will implement 'Cross-wind Ridges' and 'Surface Roughening' (57% and 45% control efficiency respectively) as cropland controls on his/her 109 acres of fallow land.
- Farmer B responds that he/she will implement 'Chips/Mulches' and 'Wind Barriers' (33% and 45% control efficiency respectively) as cropland controls on his/her 150 acres of fallow land.

Based on this information average non-high risk day cropland control efficiency for fallow fields can be calculated utilizing the following equation:

$$CE_{avg} = \frac{\left(\left(1-(1-CE_{a1})\times(1-CE_{a2})\right)\times A_a\right)+\left(\left(1-(1-CE_{b1})\times(1-CE_{b2})\right)\times A_b\right)}{A_a+A_b}$$

which becomes

$$CE_{avg} = \frac{\left(\left(1-(1-57\%)\times(1-45\%)\right)\times 109\ acres\right)+\left(\left(1-(1-33\%)\times(1-45\%)\right)\times 150\ acres\right)}{109\ acres+150\ acres} = 69\%$$

where

CE_{avg} = average crop specific/fallow field windblown dust emission control efficiency (%),
CE_x = crop specific/fallow field windblown dust emission control efficiency assigned to farmer x given his/her survey responses (where x = A, B, C…), and
A_x = the acreage of fallow land reported by farmer x (where x = A, B, C…).

R18-2-610.03(B)(1)(b) outlines those controls which are required for implementation during high risk forecast days. For all crops and for fallow land, calculated non-high risk and high risk day controls were equivalent for windblown dust.

Additional Assumptions/Notes:

- Farmers who only chose multi-year crop as a control for a given crop were excluded from control efficiency calculations as the emission reductions associated with this control are already inherently taken into account through emission rate calculations for those crops through the use of the vegetative factor.
- Due to insufficient survey response data, Cropland control efficiencies could not be calculated for corn. Therefore, the Cropland control efficiencies for vegetables (the lowest calculated Cropland control efficiencies) were used as a surrogate.

D3.1.1.7 Commercial Crop Operation Control Effectiveness

Control effectiveness is calculated as the product of control efficiency, rule effectiveness, and rule penetration. For each of the control efficiencies described above, control effectiveness was calculated in order to adequately reflect emission reductions. For all operations outlined above a consistent rule penetration and rule effectiveness was estimated for all crops. The methods by which these were estimated are presented below.

Rule Penetration Estimation

ADEQ utilized 2007 USDA Agricultural Census data for determining the rule penetration of R18-2-610.03. R18-2-610 definitions describe a commercial crop farm as having a lower acreage limit of 10 contiguous acres. The 2007 Agricultural Census reported farm sizes by acreage in Pinal County (Table D3-3). Based on the farm number for each size category, ADEQ calculated the distribution of farms by number within each farm size bin. While this distribution includes animal and crop farms, ADEQ assumed the crop-only farm distribution would be equivalent.

Table D3-3. Pinal County Farm Size Distribution		
Farm Size	Farm Number in Pinal	Percentage of Total Farms
1 to 9 acres	217	28%
10 to 49 acres	192	24%
50 to 179 acres	122	16%
180 to 499 acres	72	9%
500 to 999 acres	78	10%
1,000 acres +	104	13%
Total	785	100%

As emissions from croplands are estimated based on the crop field's aerial extent, rule penetration is dependent on the area of land to which the rule is applicable, not the number of farms. Therefore, ADEQ estimated the area associated with each size category listed in Table D3-3.

ADEQ estimated the number of crop farms within the nonattainment area by multiplying the reported number of crop farms in the County (480) by the ratio of ADEQ/PCAQCD identified crop acreage in the nonattainment area 249,039 to the acreage reported in (USDA, 2012), 256,042. This resulted in an estimated 467 crop farms located in the nonattainment area (467 farms = [249,039 acres / 256,042 acres] * 480 farms). ADEQ then assumed these farms would have the same size distribution as listed in Table D3-3. ADEQ further assumed all farms within a size category would have acreage equivalent to the mid-point acreage of that size category. In the instance of the largest size category where an upper bound is not listed, ADEQ calculated the total acreage from all farm size categories <1,000 acres, subtracted this acreage from the total nonattainment area identified crop acreage, and divided this value by the number of 1,000+ acre farm to estimate an average size. ADEQ was then able to estimate the percentage of farmland, by acreage, associated with each farm size bin (Table D3-4). ADEQ interpreted rule penetration as the percentage of crop farm area associated with farms of 10+ acre size (*i.e.,* 99.7%). This rule penetration was applied to all crop farm operation control efficiencies.

Table D3-4. Estimated Crop Farm Size Distribution by Associated Acreage				
Farm Size	Estimated Farms in NAA	Estimated Average Farm Size (acres)	Total Acreage	Total Cropland (%)
1 to 9 acres	129	5	645	0.26%
10 to 49 acres	114	30	3,369	1.35%
50 to 179 acres	73	115	8,308	3.34%
180 to 499 acres	43	340	14,538	5.84%
500 to 999 acres	46	750	34,769	13.96%
1,000 acres +	62	3,030	187,410	75.25%
Total	467		249,039	100.00%

Rule Effectiveness

Rule effectiveness was estimated using the criteria outlined in (EPA, 2005). This guidance outlines three ranges for which rule effectiveness are primarily anticipated to occur for non-point sources. The guidance lists inspection compliance as the most important factor when making a determination of rule effectiveness, followed by other factors including, but not limited to:

- Source subjection to compliance certification;
- Detail of inspections;
- Frequency of unannounced inspections;
- Percent of facilities inspected within a given year;
- Frequency of enforcement action for violations; and
- Availability of compliance assistance programs.

As farmer compliance with the new Agricultural BMP Rule is not currently available since the rule had not been implemented at the time of this SIP preparation, ADEQ relied on compliance experience with the previous version of the Agricultural BMP Rule to estimate rule effectiveness. Given the factors listed above, ADEQ determined a rule effectiveness of >75% was appropriate. ADEQ compliance staff report 100% compliance of farmers with the current agricultural rule; however, certain limitations exist in response to other listed important factors for rule effectiveness determination:

- Sources are not subject to compliance certification;
- Inspections are generally announced;
- <15% of facilities are inspected per year; and
- Past enforcement action has been limited.

While a few limitations occur, the reported compliance rate is currently 100% and a compliance assistance program for the crop farming community exists that is well staffed between ADEQ, the Arizona Department of Agriculture, and the Agricultural BMP Committee. Therefore, ADEQ determined it was appropriate to assume 80% rule effectiveness. This rule effectiveness was applied to all crop farm operation control efficiencies.

Control Effectiveness Calculation

Control Effectiveness is calculated as the product of control efficiency, rule effectiveness, and rule penetration. ADEQ calculated a suite of crop operation control effectivenesses listed below (Table D3-5). Additionally, farm road control effectiveness for windblown dust on non-high risk days and high risk days was calculated as 38.8%, and farm road control effectiveness for activity related emissions were calculated as 44.9% for non-high risk days and 45.4% for high risk days (only non-high risk day control effectiveness was utilized in emission reduction calculations). Finally, fallow land has a calculated windblown dust control effectiveness of 77.2%.

Table D3-5. Commercial Farm Operation Control Effectiveness Estimated by Scenario								
Scenario / Season	Emissions	Forecast	Alfalfa	Cotton	Forage	Vege-tables	Corn	Grain
Tillage	Activity	Non-High Risk	25.1%	35.0%	36.5%	19.1%	45.8%	42.0%
		High Risk	79.8%	51.4%	79.8%	19.1%	75.1%	66.9%
	Windblown	Non-High Risk	14.4%	61.0%	64.7%	51.7%	64.7%	19.6%
		High Risk	20.5%	61.0%	64.7%	51.7%	64.7%	24.5%
Harvest	Activity	Non-High Risk	17.6%	30.4%	25.5%	1.6%	37.5%	29.9%
		High Risk	24.8%	58.6%	73.2%	79.8%	74.2%	62.0%
	Windblown	Non-High Risk	40.6%	66.9%	51.2%	50.3%	72.0%	69.0%
		High Risk	40.6%	66.9%	51.2%	50.3%	72.0%	69.0%
Cropland	Windblown	Non-High Risk	73.2%	76.2%	61.2%	50.3%	50.3%	76.7%
		High Risk	73.2%	76.2%	61.2%	50.3%	50.3%	76.7%

Annual tillage and harvest activity control effectiveness were calculated by weighting the non-high risk day and high risk day crop specific control effectiveness by the number of days per year estimated to be forecasted as non-high risk (366 – 45 = 321) and those estimated to be forecasted as high risk days (45), respectively. The results are presented in Table D3-6.

Table D3-6. Commercial Farm Operation Annual Activity Related Control Effectivenesses						
Scenario	Alfalfa	Cotton	Forage	Vegetables	Corn	Grain
Tillage	31.9%	37.0%	41.9%	19.1%	49.4%	45.1%
Harvest	18.5%	33.9%	31.3%	11.2%	42.0%	33.9%

Annual windblown control effectivenesses were calculated for each crop for two separate scenarios, disturbed seasons and stabilized seasons. Disturbed seasons were assumed to occur when soils were actively being disturbed during periods of little to no ground cover. This included tillage/planting seasons and harvesting seasons in the crop calendar for each crop. The stabilized season was assumed to occur during the cropland season (after harvest and prior to planting). As windblown emissions do not occur during the growing season (ground cover and regular watering are assumed to eliminate windblown emissions during this portion of the year), the growing season is excluded from control effectiveness calculations. The methods by which annual average disturbed and stabilized windblown control effectivenesses are calculated are outlined in the examples below:

Disturbed Windblown Control Effectiveness for Cotton

$CE_{T\text{-}NHR}$ = Non-high risk day control effectiveness (tillage) = 61.0%

$CE_{T\text{-}HR}$ = High risk day control effectiveness (tillage) = 61.0%

$CE_{H\text{-}NHR}$ = Non-high risk day control effectiveness (harvest) = 66.9%

$CE_{H\text{-}HR}$ = High risk day control effectiveness (harvest) = 66.9%

D = High risk days per year = 45

L_T = Length of Tillage season (% of annual) = 19.44%

L_H = Length of Harvest season (% of annual) = 38.89%

$$CE = \frac{\left(\frac{CE_{T-NHR} \times [366 - D] + CE_{T-HR} \times [D]}{366}\right) \times L_T + \left(\frac{CE_{H-NHR} \times [366 - D] + CE_{H-HR} \times [D]}{366}\right) \times L_H}{L_T + L_H}$$

which becomes

$$64.9\% = \frac{\left(\frac{61.0\% \times [366 - 45] + 61.0\% \times [45]}{366}\right) \times 19.4\% + \left(\frac{66.9\% \times [366 - 45] + 66.9\% \times [45]}{366}\right) \times 38.9\%}{19.4\% + 38.9\%}$$

Stabilized Windblown Control Effectiveness for Cotton

$CE_{C\text{-}NHR}$ = Non-high risk day control effectiveness (cropland) = 76.2%

$CE_{C\text{-}HR}$ = High risk day control effectiveness (cropland) = 76.2%

D = High risk days per year = 45

$$CE = \frac{CE_{C-NHR} * (366 - D) + CE_{C-HR} * (D)}{366}$$

which becomes

$$76.2\% = \frac{76.2\% * (366 - 45) + 76.2\% * (45)}{366}$$

Utilizing these methodologies, ADEQ was able to calculate annually averaged disturbed and stabilized windblown emission control effectivenesses for each crop of interest. The results of these calculations are presented in Table D3-7.

Table D3-7. Commercial Farm Operation Annual Windblown Control Effectivenesses

Scenario	Alfalfa*	Cotton	Forage*	Vegetables	Corn	Grain
Disturbed	40.6%	64.9%	51.2%	50.7%	68.8%	46.2%
Stabilized	-	76.2%	-	50.3%	50.3%	76.7%

*Alfalfa and forage are assumed to not experience cropland periods and so stabilized control effectivenesses could not be calculated.

Control Effectiveness Application

Emission reduction estimates depend not only on the magnitude of control effectiveness, but also the manner in which control effectiveness is applied to emissions. Given the transient nature of crop seasons it is important to pay special attention to the method by which reductions are applied. This section outlines the methods by which calculated control effectivenesses were applied to crops and commercial farm roads on design days and annually for activity emissions and windblown emission calculations.

Crops

Table D3-5 presents the calculated tillage, harvest, and cropland control effectivenesses for each crop inventoried. Activity emission controls are applied to those emissions originating from human induced mechanical entrainment of dust particles into the atmosphere. Windblown control effectivenesses calculated and presented in Table D3-5 apply to those emissions from

disturbed and stabilized soils which result from the mechanical lifting of particles by wind and thus only apply during periods of high wind (>12 mph).

Design days were assumed to be forecast as high risk. As such, crop specific control effectivenesses utilized for design days were all assumed to correspond to those calculated under the high risk scenarios presented in Table D3-5. Additionally, non-windblown estimated emissions on stagnation and high wind design days were assigned those crop specific control effectivenesses which are listed in the "Activity" rows in Table D3-5. Finally, for activity emissions, crop specific control effectivenesses were applied to tillage or harvesting emission factors dependent on the activity taking place. For tillage and harvesting emissions originating from unidentified agricultural land, the crop acreage weighted average control effectiveness for the modeling domain was calculated and applied to the emission factor for those agricultural lands.

Application of crop specific control effectivenesses for windblown dust presented in Table D3-5 was dependent on the crop season in which a design day took place. Consultation of the Pinal County crop calendar (Appendix B) determined whether a given crop was in the tillage/planting, growing, harvesting, or cropland season. Determination of the season dictated which control effectiveness from Table D3-5 was utilized. Once applicable control effectiveness was determined, it was applied to a given crop's domain specific windblown emission rate. These controlled emission rates were then used to calculate revised emissions for each commercial crop field within the design day domain of interest. To maintain consistency with the methodology used for calculation of windblown dust originating from unidentified agricultural lands, the fallow field windblown dust control effectiveness was applied to these fields.

Annual activity control effectivenesses were applied to the tillage and harvest emission rate of each crop. Annual emissions were then recalculated utilizing the controlled emission rates.

As crop cultivation on individual agricultural fields in the nonattainment area were not resolved outside of the modeling domains, ADEQ relied on the crop distribution reported in the 2007 Agricultural Census to determine an average controlled emission rate for all parcels. This was performed by first determining the percentage of the year each crop was either in a disturbed state (tillage and harvesting seasons) and a stabilized state (cropland season) (Exhibit DI3). These percentages were reduced by the control effectivenesses previously reported (by multiplying by [1 – CE] listed in Table D3-7). These values were then multiplied individually by their corresponding proportion of agricultural land within the nonattainment area and crop cover value assigned to each crop (detailed in Appendix B, Section 3.1.2). Disturbed and stable values were then summed across all crop types in order to calculate a weighted disturbance level and stabilized disturbance level for all agricultural fields within the nonattainment area. These controlled and weighted disturbance levels were then multiplied by wind speed dependent emission rates for each high wind hour of the year for each agricultural crop parcel in order to calculate total nonattainment area crop windblown dust.

Commercial Farm Roads

While ADEQ calculated a slightly increased control effectiveness for activity related emissions on commercial farm roads on high risk days as opposed to non-high risk days (44.9% vs. 45.4%), ADEQ did not have adequate information to identify individual commercial farm roads in the

nonattainment area that experience >20 VDT. Therefore, a conservative approach was taken by ADEQ and all agricultural roads were assumed to be controlled using the non-high risk day control effectiveness for activity related emissions on all design days and for the annual inventory calculation. The emission reduction calculation due to these controls was realized by multiplying the agricultural unpaved road reentrained road dust emission factor by 1 minus the activity control effectiveness. This revised emission factor was then used to calculate controlled agricultural unpaved road dust.

Windblown dust control effectiveness for commercial farm roads was calculated as 38.8% on both non-high risk days and high risk days. The emission reduction calculation due to these controls was realized by multiplying the agricultural unpaved road reentrained road dust emissions calculated for each road segment by 1 minus the windblown control effectiveness.

D3.1.1.8 Crop Operation Control Emission Reductions

As previously noted, crop operation controlled emission reductions were credited towards attainment demonstration of the NAAQS for 2018. This section presents the calculated emission reductions for each modeling domain for the high wind and stagnation design days and within the nonattainment area for the year 2018.

Design Day Emission Inventory Reductions

Table D3-8 and Table D3-9 present the emission reductions attributable to crop operation controls for each design day modeled for attainment. It should be noted that the Cowtown and Maricopa modeling domains contain Tribal and non-Tribal agriculture. Controls were assumed to not impact Tribal agricultural operations as these operations are not under the jurisdiction of R18-2-610.03. As such, their emissions are excluded from Table D3-8 and Table D3-9.

Table D3-8. 2018 Crop Agriculture Emission Reductions for Stagnation Design Days				
Modeling Domain	EI Sector	Uncontrolled Emissions (lbs/day)	Controlled Emissions (lbs/day)	Emission Reductions (lbs/day)
Cowtown	Non-Tribal Crop Agriculture*	232	96	136
	Unpaved Agricultural Roads	3,798	2,093	1,705
Pinal County Housing	Crop Agriculture	379	156	223
	Unpaved Agricultural Roads	1,837	1,012	825
Stanfield	Crop Agriculture	880	364	516
	Unpaved Agricultural Roads	7,628	4,203	3,425

Table D3-9. 2018 Crop Agriculture Emission Reductions for High Wind Design Days					
Emission Type	Modeling Domain	EI Sector	Uncontrolled Emissions (lbs/day)	Controlled Emissions (lbs/day)	Emission Reductions (lbs/day)
Activity	Cowtown	Non-Tribal Crop Agriculture*	645	238	407
		Unpaved Agricultural Roads	3,253	1,792	1,461
	Maricopa	Non-Tribal Crop Agriculture*	178	74	104
		Unpaved Agricultural Roads	2,023	1,114	909
	Pinal County Housing	Crop Agriculture	954	367	587
		Unpaved Agricultural Roads	3,422	1,886	1,536
	Stanfield	Crop Agriculture	1,058	413	645
		Unpaved Agricultural Roads	7,268	4,004	3,264
Windblown	Cowtown	Non-Tribal Crop Agriculture*	3,906	1,127	2,779
		Unpaved Agricultural Roads	340	208	132
	Maricopa	Non-Tribal Crop Agriculture*	4,899	1,281	3,618
		Unpaved Agricultural Roads	539	330	209

	Pinal County Housing	Crop Agriculture	31,617	10,112	21,505
		Unpaved Agricultural Roads	2,303	1,410	893
	Stanfield	Crop Agriculture	4,619	1,084	3,535
		Unpaved Agricultural Roads	280	171	109

*The Cowtown and Maricopa domains included Tribal crop agriculture which was assumed to not be affected by controls.

Annual Emission Inventory Reductions

Table D3-10 presents the annual emission reductions attributable to crop operation controls.

Table D3-10. 2018 Crop Agriculture Emission Reductions for the Annual Inventory

Emission Type	EI Sector	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)	Emission Reductions (TPY)
Activity	Crop Agriculture	2,853	1,865	988
	Unpaved Agricultural Roads	16,350	9,009	7,341
Windblown	Crop Agriculture	19,510	7,122	12,388
	Unpaved Agricultural Roads	1,756	1,051	705

D3.1.2 Requirements for Commercial Dairy Operations

R18-2-611.03 establishes the rules targeted at controlling dust generation from commercial dairy operations within the Pinal County PM_{10} Nonattainment Area. Controls adopted under the general permit established in this rule focus on the following commercial dairy sectors/operations:

- Arenas, Corrals, Pens (R18-2-611.03(D)(1)),
- Animal Waste (and Feed) Handling and Transporting (R18-2-611.03(D)(2)),
- Animal Access Connections (R18-2-611.03(D)(3)),
- Unpaved Roads or Feed Lanes (R18-2-611.03(D)(4)),

For these sectors/operations, a commercial farmer is required to implement controls from a menu of ADEQ approved measures which will reduce activity related and/or windblown PM_{10} emissions on all days of the year. For high risk forecast days, commercial crop farmers must ensure implementation of controls on unpaved roadways of >20 vehicle daily trips (VDT) from a more restrictive menu of options.

This section describes the methods by which emission reductions were estimated in response to the implementation of R18-2-611.03(D). Emission reductions calculated from the control of the above listed sector/operations are credited toward meeting contingency goals for the SIP.

D3.1.2.1 Dairy Operation Best Management Practices Surveys

In order to estimate commercial dairy operation emission reductions associated with the implementation of this rule, ADEQ needed to understand which BMPs a commercial dairy operation would be most likely to implement for each subsection of the rule. With the help of the Agricultural Best Management Practices Committee, ADEQ surveyed Pinal County dairy farmers to determine the likelihood of individual BMP implementation.

Control measure implementation feedback from dairy farmers was requested using the survey presented in Exhibit DI4. The survey requests information on which control measure/s each

farmer expects to implement for each sector/operation. Individual surveys were requested from each dairy farmer operating in the nonattainment area. Surveys were distributed by the Ag BMP Committee. Surveys were either made available directly to growers or an electronic copy was provided. Compiled and raw survey results for all farmers were received electronically by ADEQ from the Ag BMP Committee designated personnel on June 13th, 2014.

Responses to the dairy operation surveys were received from 23 farmers in the Pinal County nonattainment area. Ag BMP committee designated personal reported that 25 operations operate within the Pinal PM_{10} nonattainment area. This represents a 92% responsiveness rate from surveyed dairies in the nonattainment area, indicating that the sample size utilized for dairy control efficiency calculation is extremely robust. Furthermore, analysis of survey results by ADEQ personnel revealed that all surveys received responded in a manner that was consistent with all requirements of R18-2-611.03(D) (*i.e.*, each farmer responded with at least one BMP they plan to implement for each of the commercial dairy sectors/operations listed above). Therefore, all survey results received were included in the calculation of dairy control efficiencies.

D3.1.2.2 Arenas, Corrals, Pens Control Efficiency Calculation

Emission reductions from control of arenas, corrals, and pens (R18-2-611.03(D)(1), henceforth referred to as arenas) were credited toward meeting contingency measure goals. Dairy operation BMP surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey provided responses adequate to meet the requirements of R18-2-611.03(D)(1). Where farmers reported multiple BMPs for implementation, the farmer was only given credit for that control with the highest efficiency (a list of control efficiencies and their references are presented in Exhibit DI5).

Average arena activity control efficiency was calculated by weighting individually assigned dairy facility control efficiencies (assigned using the methods outlined in the preceding paragraph) by the dairy facility's head of cattle reported, using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will 'Feed Green Chop' (10% control efficiency for arena activity emissions) as a control for his/her 11,000 head of cattle.
- Farmer B responds that he/she will 'Cement Dairy Cattle Walkways to Milk Barn' (25% control efficiency for arena activity emissions) as a control for his/her 2,000 head of cattle.
- Farmer C responds that he/she will use 'Water Misting Systems' (10% control efficiency for arena activity emissions) as a control for his/her 6,900 head of cattle.

Based on this information average activity emission control efficiency for arenas was calculated utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times N_a) + (CE_b \times N_b) + (CE_c \times N_c)}{N_a + N_b + N_c}$$

which becomes

$$CE_{avg} = \frac{(10\% \times 11{,}000\ head) + (25\% \times 2{,}000\ head) + (10\% \times 6{,}900\ head)}{11{,}000\ head + 2{,}000\ head + 6{,}900\ head} = 12\%$$

where

CE_{avg} = average dairy activity emission control efficiency (%),

CE_x = the activity emission control efficiency assigned to facility x given the survey response (where x = A, B, C…), and

N_x = the head of cattle reported for facility x (where x = A, B, C…).

BMPs for arena emission control are outlined in R18-2-611.03(D)(1). Some of these controls reduce not only activity emissions but also stabilize the soil surface, reduce wind speed or alter its path across the soil surface, or provide ground cover to reduce windblown dust emissions. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity emission efficiencies were replaced by windblown emission efficiencies. ADEQ did not take any additional emission reduction credits for those days identified as high risk.

D3.1.2.3 Animal Waste (and Feed) Handling and Transporting Control Efficiency Calculation

Emission reductions from control of animal waste (and feed) handling and transporting (henceforth referred to as handling and transporting) (R18-2-611.03(D)(2)) were credited toward meeting contingency measure goals. Dairy operation BMP surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey provided responses adequate to meet the requirements of R18-2-611.03(D)(2). Where farmers reported multiple controls for implementation, the farmer was only given credit for that control with the highest control efficiency (a list of control efficiencies and their references are presented in Exhibit DI5).

Average activity emission handling and transporting control efficiency was calculated by weighting individually assigned dairy facility control efficiencies (assigned using the methods outlined in the preceding paragraph) by the dairy facility's head of cattle reported, using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will 'Cover Manure Hauling Trucks' (10% control efficiency for handling and transporting activity emissions) as a control for his/her 11,000 head of cattle.
- Farmer B responds that he/she will 'Feed High Moisture Feed' (10% control efficiency for handling and transporting activity emissions) as a control for his/her 2,000 head of cattle.
- Farmer C responds that he/she will 'Store Silage in Bunkers' (10% control efficiency for handling and transporting activity emissions) as a control for his/her 6,900 head of cattle.

Based on this information we can calculate average activity emission control efficiency for handling and transporting utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times N_a) + (CE_b \times N_b) + (CE_c \times N_c)}{N_a + N_b + N_c}$$

which becomes

$$CE_{avg} = \frac{(10\% \times 11{,}000\ head) + (10\% \times 2{,}000\ head) + (10\% \times 6{,}900\ head)}{11{,}000\ head + 2{,}000\ head + 6{,}900\ head} = 10\%$$

where

CE_{avg} = average dairy activity emission control efficiency (%),

CE_x = the activity emission control efficiency assigned to facility x given the survey response (where x = A, B, C…), and

N_x = the head of cattle reported for facility x (where x = A, B, C…).

BMPs for handling and transport emission control are outlined in R18-2-611.03(D)(2). Some of these controls reduce not only activity emissions but also stabilize the soil surface, reduce wind speed or alter its path across the soil surface, or provide ground cover to reduce windblown dust emissions. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity efficiencies were replaced by windblown efficiencies. ADEQ did not take any additional emission reduction credits for those days identified as high risk.

D3.1.2.4 Unpaved Access Connection Control Efficiency Calculation

Emission reductions from controls implemented on unpaved access connections (R18-2-611.03(D)(3)) were credited toward meeting contingency measure goals. Dairy operation BMP surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey provided responses adequate to meet the requirements of R18-2-611.03(D)(3). Where farmers reported multiple controls for implementation, the farmer was only given credit for that control with the highest control efficiency (a list of control efficiencies and their references are presented in Exhibit DI5).

Average activity emission unpaved access connection control efficiency was calculated by weighting individually assigned dairy facility efficiencies (assigned using the methods outlined in the preceding paragraph) by the dairy facility's head of cattle reported, using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will 'Apply and Maintain Aggregate Cover' (46% control efficiency for unpaved access connection activity emissions) as a control for his/her 11,000 head of cattle.

- Farmer B responds that he/she will 'Install Signage to Limit Vehicle Speed to 15mph' (23% control efficiency for unpaved access connection activity emissions) as a control for his/her 2,000 head of cattle.
- Farmer C responds that he/she will 'Restrict Access to Through Traffic' (2% control efficiency for unpaved access connection activity emissions) as a control for his/her 6,900 head of cattle.

Based on this information we can calculate average activity emission control efficiency for unpaved access connections utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times N_a) + (CE_b \times N_b) + (CE_c \times N_c)}{N_a + N_b + N_c}$$

which becomes

$$CE_{avg} = \frac{(46\% \times 11{,}000\ head) + (23\% \times 2{,}000\ head) + (2\% \times 6{,}900\ head)}{11{,}000\ head + 2{,}000\ head + 6{,}900\ head} = 28\%$$

where

CE_{avg} = average dairy activity emission control efficiency (%),

CE_x = activity emission control efficiency assigned to facility x given their survey response (where x = A, B, C…), and

N_x = the head of cattle reported for facility x (where x = A, B, C…)

(Note: Please note that ADEQ assumed the length of unpaved access connections for a facility is proportional to the size of the facility, which is in turn proportional to the number of head of cattle within a facility. As such, cattle head is used as a surrogate for unpaved access connection length.)

BMPs for unpaved access connection emission control are outlined in R18-2-611.03(D)(3). Some of these controls reduce not only activity emissions but also stabilize the soil surface, reduce wind speed or alter its path across the soil surface, or provide ground cover to reduce windblown dust emissions. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity efficiencies were replaced by windblown efficiencies. ADEQ did not take any additional emission reduction credits for those days identified as high risk.

D3.1.2.5 Unpaved Roads or Feed Lanes Control Efficiency Calculation

Emission reductions from control of unpaved roads or feed lanes (henceforth referred to as unpaved roads) (R18-2-611.03(D)(4)) were credited toward meeting contingency measure goals. Dairy operation BMP surveys were used as guidance to determine the percentage of farmers implementing a given BMP. Each survey provided responses adequate to meet the requirements of R18-2-611.03(D)(4). Where farmers reported multiple controls for implementation, the farmer was only given credit for that control with the highest efficiency (a list of control efficiencies and

their references are presented in Exhibit DI5). ADEQ assumed these controls would be applied to all unpaved roads within the operation.

Average activity emission unpaved road control efficiency was calculated by weighting individually assigned dairy facility efficiencies (assigned using the methods outlined in the preceding paragraph) by the dairy facility's head of cattle reported, using the sample method below:

Simplified Example Calculation

- Farmer A responds that he/she will 'Apply and Maintain Water as a Dust Suppressant' (67% control efficiency for unpaved road activity emissions) as a control for his/her 11,000 head of cattle.
- Farmer B responds that he/she will 'Install Engine Speed Governors on Feed Trucks to 15 mph' (23% control efficiency for unpaved road activity emissions) as a control for his/her 2,000 head of cattle.
- Farmer C responds that he/she will 'Restrict Access to Through Traffic' (2% control efficiency for unpaved access connection activity emissions) as a control for his/her 6,900 head of cattle.

Based on this information we can calculate average activity emission control efficiency for unpaved roads utilizing the following equation:

$$CE_{avg} = \frac{(CE_a \times N_a) + (CE_b \times N_b) + (CE_c \times N_c)}{N_a + N_b + N_c}$$

which becomes

$$CE_{avg} = \frac{(67\% \times 11{,}000\ head) + (23\% \times 2{,}000\ head) + (2\% \times 6{,}900\ head)}{11{,}000\ head + 2{,}000\ head + 6{,}900\ head} = 40\%$$

where

CE_{avg} = average dairy activity emission control efficiency (%),

CE_x = activity emission control efficiency assigned to facility x given their survey response (where x = A, B, C…), and

N_x = the head of cattle reported for facility x (where x = A, B, C…)

(Note: Please note that ADEQ assumed the length of unpaved roads for a facility is proportional to the size of the facility, which is in turn proportional to the number of head of cattle within a facility. As such, cattle head is used as a surrogate for unpaved road length.)

BMPs for unpaved road emission control are outlined in R18-2-611.03(D)(4). Some of these controls reduce not only activity related emissions but also stabilize the soil surface, reduce wind speed or alter its path across the soil surface, or provide ground cover to reduce windblown dust emissions. As such, average windblown dust emission control efficiencies were calculated using the method described above except where activity efficiencies were replaced by windblown

emission efficiencies. ADEQ did not take any additional emission reduction credits for those days identified as high risk.

D3.1.2.6 Commercial Dairy Operations Control Effectiveness

Control effectiveness is calculated as the product of control efficiency, rule effectiveness, and rule penetration. For each of the control efficiencies described above, control effectiveness was calculated in order to adequately reflect emission reductions. For all operations/sectors outlined above a facility-wide rule penetration and rule effectiveness was estimated. The methods by which these were estimated are presented below.

Rule Penetration Estimation

ADEQ utilized 2007 USDA Agricultural Census data for determining the rule penetration of R18-2-611.03(D). R18-2-611 defines a commercial dairy as having a minimum of 150 cattle head. The 2007 Agricultural Census reported the number of statewide dairies by resident cattle head range and the total head within each range for the State of Arizona (Table D3-11). ADEQ was unable to locate county specific data for dairy cattle, and thus, State of Arizona data is used as a surrogate. As emissions from dairies are estimated based on the head of cattle, rule penetration is dependent on the head count to which the rule is applicable. Therefore, ADEQ utilized Table D3-11 to estimate the percentage of cattle to which the rule would apply. This percentage was assumed to equate to rule penetration.

Table D3-11. State of Arizona Dairy Farm Distribution

Head / Farm	Farms (#)	Total head (#)
1 to 9	103	*
10 to 19	-	-
20 to 49	1	*
50 to 99	1	*
100 to 199	4	630
200 to 499	6	2,340
500 or more	67	180,517
Total	182	183,744

*Below reported limit

R18-2-611 defines a commercial dairy operation as having >150 dairy cattle. As (USDA, 2012) reports cattle head per farm for the size distribution of 100-199 (Table D3-11), ADEQ assumed that half of the 630 cattle within this range would reside on operations of >150 head. Furthermore, while Table D3-11 does not specify the cattle head associated with the operation ranges below 100 head/farm, it can be calculated as the total head reported less those cattle reported on operations >100 head (*i.e.*, 183,744 – [180,517 + 2,340 + 630] = 257 head). Therefore, ADEQ estimates that 572 cattle head occur on farms with <150 head. Finally, ADEQ estimates rule penetration as 99.7% (*i.e.*, 99.7% = [183,744 – 572] / 183,744).

Rule Effectiveness

ADEQ assumed rule effectiveness to be equal to that of Commercial Beef Cattle Feedlots. Please refer to Section D3.1.3 for a description of how rule effectiveness was estimated for these operations.

Control Effectiveness Calculation

Control Effectiveness is calculated as the product of control efficiency, rule effectiveness, and rule penetration. ADEQ calculated an activity emission and windblown emission control effectiveness for each dairy operation/sector (Table D3-12).

Table D3-12. Commercial Dairy Operation Control Effectivenesses by Operation / Sector

Operation / Sector	Activity Control Effectiveness (%)	Windblown Control Effectiveness (%)
Unpaved Access Connections and Equipment Areas	33.9%	33.1%
Unpaved Roads or Feed Lanes	33.4%	32.6%
Animal Feeding, Waste Handling and Transporting	6.9%	6.9%
Arenas, Corrals and Pens	18.2%	12.8%

As dairy emissions are estimated by one emission factor that takes into account all emission sources within a facility on a per head basis, ADEQ estimated facility-wide control effectivenesses by utilizing emission rate estimates from (Governor's Agricultural BMP Committee, 2010) (see Table D3-13). From these emission factors ADEQ was able to calculate the relative fraction each operation/sector produces. The sum product of the fraction of total emissions presented in Table D3-13 was multiplied by the activity control effectiveness and windblown control effectiveness for each operation/sector (Table D3-12) in order to calculate average annual dairy control effectiveness for activity emissions and windblown emissions respectively (Table D3-14).

Table D3-13. Dairy Cattle Emission Factors by Livestock Activity

Operation / Sector	Emission Factor (lbs/hd/yr)	Fraction of Total Emissions (%)
Unpaved Access Connections and Equipment Areas	0.123	2.36%
Unpaved Roads or Feed Lanes	0.369	7.08%
Animal Feeding, Waste Handling and Transporting	0.123	2.36%
Arenas, Corrals and Pens	4.60	88.2%

Table D3-14. Average Annual Dairy Control Effectiveness

Emission Scenario	Control Effectiveness (%)
Activity Emissions	19.4%
Windblown Emissions	14.5%

Control Effectiveness Application

As dairy emission reductions were only credited towards contingency requirements, emission reductions were only calculated at the annual, nonattainment area-wide scale. Activity emissions were reduced by the control effectiveness listed in Table D3-14 by multiplying the uncontrolled dairy emission factor by 0.806 (*i.e.*, 0.806 = 1 - 0.194). This controlled emission factor (4.20 lbs/head/yr) was then used to calculate controlled dairy emissions nonattainment area-wide.

Dairy windblown emission reductions were calculated on the annual scale for the nonattainment area by alteration of the disturbed : stable land ratio of dairies. Uncontrolled dairies are assumed to have a disturbed : stable ratio of 50% : 50% (Appendix B, Section 3.1.2). ADEQ assumed dairy controls would reduce disturbed and stable emissions by the control effectiveness listed in Table D3-14. As such, the disturbed : stable ratio was reduced to 42.7% : 42.7% (*i.e.*, 42.7% = 50% - [50% * 14.5%]). This ratio was then applied to all dairy operations and uncontrolled stable and disturbed windblown dust emission factors were applied to calculate windblown dust originating from controlled dairies within the nonattainment area for 2018.

D3.1.2.7 Dairy Operation Control Emission Reductions

As previously noted, dairy operation controlled emission reductions were credited towards contingency measure requirements. This section presents the calculated annual nonattainment area-wide emission reductions for the year 2018. As this control was utilized for contingency purposes, design day emissions reductions were not analyzed.

Annual Emission Inventory Reductions

Table D3-15 presents the annual emission reductions attributable to crop operation controls.

Table D3-15. 2018 Emission Reductions Attributable to Dairy Operation Controls

Emission Type	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)	Emission Reductions (TPY)
Activity	184	148	36
Windblown	450	384	66

D3.1.3 Requirements for Commercial Beef Cattle Feedlots

Unlike crop and dairy operations, the number of commercial beef cattle feedlots covered by the rule is quite limited. Only 3 beef feedlots with more than 500 head of cattle (the size threshold prescribed in R18-2-611) were identified in the 2018 inventory of the NA, as the result of the closure, consolidation, or repurposing of the other operations in the 2008 inventory. These 3 feedlots account for all of the CAFO emissions in the 2018 inventory (there are no operations which expect to raise under 500 head in 2018; see Table D3-16), and so the overall rule penetration for this section is set at 100%.

Because there is no inspection and compliance history for these 3 operations, the rule effectiveness was conservatively assumed to be in the lowest interval specified for non-point sources in Attachment 2 of (EPA, 2005), Range 3 (less than 70%). To acknowledge the

recordkeeping/compliance requirements in Subsections H, I, and J of R18-2-611.03, ADEQ selected a rule effectiveness of 69% (the highest whole number percentage in Range 3).

Subsections A and E of the rule require commercial beef cattle feedlot operators to select a BMP from each of 4 menus, covering emissions from various activities on the lot. Since only 3 operations are included in the inventory, the accuracy of ADEQ's estimates of controlled emissions relies heavily on the selection of BMPs at each feedlot. The operators of each feedlot were surveyed by an expert from the Arizona Cattle Feeders' Association— (Aja, 2015)—who provided ADEQ with detailed information regarding activity levels and emission factor parameters prior to BMP implementation, as well as each operation's expected BMP choices. Unless otherwise noted, all activity levels and emission factor parameters below are estimated based on that source.

D3.1.3.1 Arena, Corral, and Pen Floors

The first menu, R18-2-611.03(E)(1), prescribes control options for the arenas, corrals, and pens in which the cattle are usually kept. Two operations are expected to remove manure from pen floors every six months (the baseline frequency was once per year), while the third is expected to apply at least 3 gallons of water per head to the pen floor each day (the baseline range was 1-3 gal/head-day; for simplicity, ADEQ assumed an average of 2 gal/head-day). PM_{10} emissions from pen floors, both activity-driven and windblown, originate from manure on the pen floor. If the manure is dehydrated, the mechanical activity of the cattle's hooves will cause it to crumble, making it vulnerable to suspension by high winds or by further hoof activity. If it is sufficiently hydrated, hoof action will instead compress the manure into a less emissive, compacted layer. Therefore, the control methods discussed in this section are preventative to the extent that they cause manure to remain hydrated. The average moisture content of the manure depends on how much manure is present and how much moisture is added. According to (Sakirkin, Maghirang, Amosson, & Auvermann, 2012), 650 gallons per acre per inch of manure is the conservative limit of added moisture required to reach 30% moisture content. ADEQ therefore used the equation $M = \frac{30\%}{650\ \text{gal/acre-in}} \cdot \frac{W \cdot H}{A \cdot D}$ to determine the manure moisture content, where M is the percent moisture content, W is the daily water volume in gal/head, H is the number of head on the lot, A is the area of the lot in acres, and D is the depth of the uncompacted manure in inches. The baseline manure depth (when removal occurs only once per year) maxed out at around 4 inches just before removal, meaning that the average depth was around half of that maximum, *i.e.*, 2 inches. If removed twice as frequently, that average depth is expected to be reduced to about 1 inch. Table D3-16 shows the calculated moisture contents of each feedlot before and after BMP implementation, and the resulting reductions in relative potential to generate dust. The average reduction (weighted by head) is 24.74%.

Table D3-16. Typical Cattle Pen Dust Reductions							
Head count	Pen Area (acres)	BMPs	Average Uncompacted Manure Depth (inches)	Daily Water Application (gal/hd)	Moisture Content	Dust Potential [7]	Dust Potential Reduction[8]
35,000	155	None (baseline)	2	2	10.42%	81.61%	13.27%
		Add water to pens	2	3	15.63%	70.79%	
45,000	140	None (baseline)	2	2	14.84%	72.47%	41.84%
		Frequent manure removal	1	2	29.67%	42.15%	
48,000	300	None (baseline)	2	2	7.38%	87.57%	17.08%
		Frequent manure removal	1	2	14.77%	72.61%	

Subsection C requires all commercial beef feedlots, regardless of their election for ordinary days, to apply at least 3 gal/head on high-risk days. Thus the latter two feedlots in Table D3-16 would have to take additional action on such days. Table D3-17 shows the resulting impacts, which changes the weighted average reduction to 42.33%.

Table D3-17. High Risk Day Cattle Pen Dust Reductions							
Head count	Pen Area (acres)	BMPs	Average Uncompacted Manure Depth (inches)	Daily Water Application (gal/hd)	Moisture Content	Dust Potential	Dust Potential Reduction
35,000	155	None (baseline)	2	2	10.42%	81.61%	13.27%
		Add water to pens	2	3	15.63%	70.79%	
45,000	140	None (baseline)	2	2	14.84%	72.47%	72.86%
		Frequent manure removal, add water	1	3	44.51%	19.67%	
48,000	300	None (baseline)	2	2	7.38%	87.57%	34.89%
		Frequent manure removal, add water	1	3	22.15%	57.01%	

On an annual basis, 45 days out of every 365.33 is expected to be high risk[9]. The resulting annual average control efficiency for activity-based emissions is calculated as

$$\frac{45 \cdot 42.33\% + (365.33 - 45) \cdot 24.74\%}{365.33} \approx 26.91\%.$$

For windblown dust, the average reductions were weighted not by head count, but by pen acreage. The resulting averages are 21.91% for a typical day and 38.19% for a high-risk day. Because windblown dust is emitted only during high-wind hours, the annual average of these

[7] Moisture contents were converted to relative dust potentials using Figure 4 of (Sakirkin, Maghirang, Amosson, & Auvermann, 2012).

[8] Relative dust potential reduction is calculated as a percentage of the old potential, *e.g.*, $\frac{81.61\% - 70.79\%}{81.61\%} \approx 13.27\%$.

[9] The 45-day estimate was based on a study of 3 years of data, including a leap day. See Section D3.1.

control efficiencies is calculated based on high-wind hours, rather than calendar days. The CWT and STF modeling domains contain all three feedlots in the NA. Since each the CWT and STF high-wind design days have 7 high-wind hours, ADEQ assumed that each of the 35 high-wind, high risk forecast days would also include 7 high-wind hours. Thus, 245 high-wind hours per year are covered by the forecast. The STF monitor had 287 total high-wind hours in 2008, and the CWT monitor had 692, for an average of 489.5 high wind hours per year. Therefore, the annual average control efficiency for windblown dust is calculated as

$$\frac{245 \cdot 38.19\% + (489.5 - 245) \cdot 21.91\%}{489.5} \approx 30.04\%.$$

D3.1.3.2 Feed Handling

The second menu, R18-2-611.03(E)(2), prescribes control options for the handling and transport of animal waste and feed. In keeping with (Governor's Agricultural BMP Committee, 2010), ADEQ estimated control efficiency at a conservative 10% for every BMP on the menu.

D3.1.3.3 Unpaved Access Connections

The third menu, R18-2-611.03(E)(3), prescribes control options for unpaved feedlot roads which intersect the public paved road network. These BMPs are intended to reduce trackout from unpaved feedlot roads onto the paved roads. Trackout is incorporated into paved road emissions, and so these controls do not affect the CAFO emissions total. Moreover, the amount of trackout from feedlots as a subset of agricultural trackout is not quantified; because of the relatively small number of beef feedlots relative to the large number of crop operations, it is likely that any appreciable rule penetration would be an overestimate. Thus the reductions due to this provision are not quantified.

D3.1.3.4 Unpaved Roads

The fourth menu, R18-2-611.03(E)(4), prescribes control options for travel on unpaved roads or feed lanes. All 3 operations are expected to choose a BMP which reduces their vehicle speeds to 15 mph on unpaved roads (they are also expected to install signs and fences restricting thru traffic, but since the rule only requires one BMP from this category, ADEQ is only considering the effects of the speed reduction). Using the unpaved road dust equation in Section 13.2.2 of (EPA, Updated 2006), ADEQ calculated emission factors for both the baseline speed of 25 mph and the reduced speed.[10] The control efficiency for this BMP was calculated as the relative difference of these emission factors, $\frac{1.857\ \text{lbs/VMT} - 1.438\ \text{lbs/VMT}}{1.857\ \text{lbs/VMT}} \approx 22.55\%$.

[10] For both the baseline and controlled scenarios, silt and moisture contents of the road surface were assumed to match the agricultural road parameters in Table 5-11 of Appendix B.

D3.1.3.5 Summary of Reductions

Activity-based emissions from feedlots are apportioned across 4 subcategories according to Table 3-19 in Appendix B. The overall distribution is summarized in Table D3-18.

Table D3-18. CAFO Activity-Based Emissions Distribution

Source Group	Proportion of Uncontrolled Emissions
Unpaved areas	10.25%
Unpaved roads	15.00%
Feed	6.00%
Pens	68.75%

We note that (Aja, 2015) indicated that all 3 operations apply water to stabilize unpaved areas (equipment staging and storage areas) on a voluntary basis. However, since unpaved area controls are not required in the beef cattle feedlot provision, the resulting reductions are not enforceable. ADEQ therefore estimated no reductions in that subset of emissions.

The average annual control efficiency for activity-based emissions from beef cattle feedlots (weighted by the above distribution) is 22.48%. Thus, the annual reductions for activity-based emissions are $100\% \cdot 69\% \cdot 22.48\% \cdot 1{,}620.6\ \text{TPY} \approx 251.4\ \text{TPY}$. For windblown dust, ADEQ compared the total area of the pens (595 acres) to the total CAFO land use area in the NA (910 acres), determined via GIS. Using this ratio as a sort of rule penetration, ADEQ calculated a control effectiveness of $\frac{595\ \text{acres}}{910\ \text{acres}} \cdot 69\% \cdot 30.04\% \approx 13.57\%$. However, because the ratio was based on land area rather than emissions, ADEQ did not apply this control effectiveness directly to the annual windblown dust emissions total. Instead, ADEQ adjusted the disturbed vs. stable proportions of the CAFO land use type from 50%-50% to 63.57% stable and 36.43% disturbed, essentially stabilizing 13.57% of the total area of feedlots in the NA. The resulting annual emissions reductions totaled 29.9 TPY.

For the CWT and STF design day inventories (the only ones which included CAFO emissions), ADEQ followed the same procedure, but used high risk day control efficiencies instead of annual average control efficiencies. The resulting activity-based emissions reductions were 738.4 lbs/day at CWT, 764.2 lbs/day for the STF stagnation design day, and 940.9 lbs/day for the STF high-wind design day[11]. An additional reduction of 55.0 lbs/day of windblown dust was estimated for the STF high-wind design day, for a total reduction of 995.9 lbs/day.

D3.1.4 Requirements for Irrigation Districts

R18-2-612.01 provides a menu of BMPs for unpaved operation and maintenance roads, canal maintenance, and unpaved utility access roads. Because emissions from canal maintenance were not separately quantified in the EI, no reductions were quantified for those BMPs (*e.g.*,

[11] The difference in activity-based reductions at STF is due to the slightly different shapes and sizes of the activity-based modeling domains for the stagnation design day and the high-wind design day. The larger of the two CAFOs in Stanfield straddles the domains' boundaries; over 100 of its acres are inside the high-wind day domain but outside of the stagnation day domain.

windblown fugitives from dredged material dumped onto land use category *X* were not singled out among the windblown emissions from *X* in general). Similarly, because access roads were not distinguished among unpaved roads, no credit was taken for those reductions.

In a GIS analysis of the unpaved road network, PCAQCD identified a subset of private unpaved roads as canal roads (*i.e.,* irrigation operation and maintenance roads). For each such road, ADEQ applied the same control efficiencies as were used for agricultural unpaved roads in general (see Section D3.1.1.5). The resulting reductions were 577.6 TPY of activity-based unpaved road dust and 144.7 TPY of windblown unpaved road dust.

D3.1.5 Other Provisions

R18-2-611.03 also provides for emissions regulation in commercial swine and poultry operations, but the 2018 NA inventory does not include any such operations. Therefore ADEQ estimated no reductions from these provisions.

D3.2 Attainment Inventories

Table D3-19 summarizes the annual NA-wide inventory as well as the design day inventories, itemized by source category (compare to the base scenario emissions in Table D2-1).

Table D3-19. Summary of Attainment Inventories

Source Category		Annual NA-Wide Emissions (TPY)	Emissions for Modeling Domains (lbs/day)						
			Stagnation Design Days			High-Wind Design Days			
			CWT	PCH	STF	CWT	MC	PCH	STF
Windblown Dust	Developed Urban	248.1	-	-	-	31.1	896.9	155.1	-
	Developed Rural	1,959.7	-	-	-	257.9	1,307.2	1,257.6	161.1
	Unpaved Roads	3,803.1	-	-	-	840.3	705.2	2,766.0	356.6
	Cleared Areas	457.0	-	-	-	141.8	2,317.1	1,590.5	19.7
	Construction	1,831.1	-	-	-	905.5	8,175.8	-	-
	Dairies	449.6	-	-	-	-	-	-	126.0
	CAFOs	125.3	-	-	-	-	-	-	408.6
	Desert Shrubland	38,276.7	-	-	-	3,881.5	1,063.1	4,600.3	967.2
	Agriculture	7,122.0	-	-	-	1,126.7	1,281.3	10,111.9	1,083.8
	Other	4,243.9	-	-	-	0.5	185.6	-	-
Activity-Based Emissions	Agriculture	1,865.1	230.0	156.4	363.9	703.2	188.9	366.9	412.6
	CAFOs	1,369.2	2,495.1	-	2,583.6	2,495.1	-	-	3,180.2
	Paved Roads	1,408.0	501.3	112.5	125.5	510.0	591.8	71.3	125.2
	Unpaved Roads	37,186.4[12]	10,180.6	2,922.1	8,901.7	9,345.3	3,404.1	5,086.5	8,230.3
	Fuel Combustion	34.9	-	-	-	-	-	2.2	0.4
	Fires	22.2	6.7	2.0	7.4	7.2	3.0	3.5	6.8
	Open Burning	16.8	1.7	0.1	0.2	2.2	13.7	0.4	0.2
	Nonroad	144.4	16.8	1.2	2.4	20.4	130.8	3.6	2.4
	Railroad	45.4	15.1	-	-	15.5	15.6	-	-
	Construction	8,499.8	3,651.0	1,131.0	2,348.0	-	3,667.0	935.0	14.0
	Dairies	184.0	-	25.5	141.0	-	-	-	187.7
	Point Sources	781.3	560.8	24.3	7.1	560.2	-	24.3	7.1
	Unpaved Parking	251.5	99.2	57.6	45.0	112.1	48.3	101.5	43.3
Total		110,325.5	17,758.5	4,432.7	14,525.8	20,956.4	23,995.4	27,076.4	15,333.4

[12] Note that emissions from unpaved test tracks at permitted vehicle testing facilities are not included here, but instead in the annual total for Point Sources. However, test track emissions are modeled just like other unpaved road emissions. Therefore, in design day inventories, they are included in Unpaved Roads.

D3.3 Modeled Attainment Results

The results of the controlled design day modeling are summarized below. All of the values in Table D3-21 have been post processed, as described in Section D2 and summarized in Table D3-20. When rounded to the nearest 10, no expected concentration at the monitor exceeds 150 µg/m^3 (though this limit is approached as closely as possible, as discussed in Section D4.2). Thus, since these are estimates of the 24-hour average PM_{10} concentrations monitored on the high-risk days expected in 2018, the NA is expected to comply with the PM_{10} NAAQS in 2018.

Table D3-20. Summary of Attainment Modeling Results

Design day		Modeled local impact[13]	Scaling factor[13]	Local impact only (µg/m³)	Background concentration (µg/m³)	Concentration at the monitor (µg/m³)
Stag.	CWT	514.1	27.4%	141.0	11.5	152.5
	PCH	75.3	190.3%	143.4		154.9
	STF	61.5	233.1%	143.2		154.7
High-Wind	CWT	198.4	52.1%	103.3	17.5	120.8
	MC	343.6	31.1%	106.8		124.3
	PCH	501.8	23.5%	117.8		135.3
	STF	125.8	75.2%	94.7		112.2

Table D3-21. Attainment Modeling Results Apportioned by Source Category

Source Category		24-Hour Average Concentrations for Modeling Domains (µg/m^3)						
		Stagnation Design Days			High-Wind Design Days			
		CWT	PCH	STF	CWT	MC	PCH	STF
Windblown Dust	Developed Urban	-	-	-	0.2	7.4	0.9	-
	Developed Rural	-	-	-	3.5	6.3	9.9	3.7
	Unpaved Roads	-	-	-	11.6	3.2	15.9	6.9
	Cleared Areas	-	-	-	1.2	15.4	5.7	2.6
	Construction	-	-	-	7.0	45.6	-	-
	Dairies	-	-	-	-	-	-	1.4
	CAFOs	-	-	-	-	-	-	5.2
	Desert Shrubland	-	-	-	42.0	8.5	20.6	18.3
	Agriculture	-	-	-	13.1	5.0	55.5	17.7
	Other	-	-	-	0.0	0.8	-	-
Activity-Based Emiss.	Agriculture	0.1	2.6	2.6	0.4	0.1	0.6	1.5
	CAFOs	105.2	-	37.1	5.5	-	-	9.2
	Paved Roads	9.2	5.5	7.0	0.5	1.1	0.1	0.7
	Unpaved Roads	24.3	93.9	91.1	17.9	1.8	8.9	27.1
	Construction	1.8	35.7	0.3	-	11.3	-	0.2
	Dairy	-	0.0	0.0	-	-	-	0.1
	Point Sources	0.2	0.0	-	0.5	-	-	-
	Unpaved Parking	0.1	5.6	5.2	0.1	0.3	0.1	0.2
Regional Background		11.5	11.5	11.5	17.5	17.5	17.5	17.5
Total		152.5	154.9	154.7	120.8	124.3	135.7	112.2

[13] The units for these values vary. See Footnote 2 on page 3 for details.

D4 On-Road Motor Vehicle Emissions Budget

D4.1 Scope

This Motor Vehicle Emissions Budget (MVEB) establishes emissions limits for PM_{10} in the NA. The budget considers the combined contributions of on-road motor vehicles as well as active construction projects on those roads. Emissions from non-road vehicles are not included in the budget, nor are windblown dust emissions from the roads and construction sites. Subcategories of sources whose emissions are expected to remain fairly constant from one year to the next are also omitted. The budget is established for annual emissions totals, and anticipates various changes in traffic, fleet characteristics, road work, and new rules and regulations up through calendar year 2018. In a separate analysis, ADEQ also took into account the control measures described in Section D5.2, and determined that this budget would provide adequate room for anticipated growth for decades beyond 2018.

The purpose of this budget is to safeguard the air quality of the NA with respect to the 24-hour PM_{10} NAAQS. As discussed in Section D3.3, modeling indicates that the NA should attain the NAAQS as long as this budget is not exceeded, as long as the emissions are distributed appropriately (using planning tools such as hotspot analyses to prevent high concentrations of PM_{10} building up in a given place and time), and as long as no unforeseen growth occurs in emissions from PM_{10} source sectors other than those included in this budget.

The following sections describe which source categories are included in the budget and reviews the emissions estimation methodologies for each, and how the emissions subtotals in the budget were determined.

D4.1.1 Unpaved Roads

Unpaved road emissions were estimated for each of a variety of road types, under a variety of circumstances (*e.g.*, public roads were subdivided into classes based on their average traffic volumes). For each road type and circumstance, two top-level equations were used to estimate PM_{10} emissions. Vehicle exhaust was calculated as:

$$\mathrm{E}_{\mathrm{Exhaust}}^{\mathrm{PM10}} = \mathrm{VMT} \times \mathrm{EF}_{\mathrm{Exhaust}}^{\mathrm{PM10}}$$

where $\mathrm{E}_{\mathrm{Exhaust}}^{\mathrm{PM10}}$ is the total PM_{10} (in TPY) emitted as vehicle exhaust on unpaved roads in the NA, VMT is the total number of Vehicle Miles Traveled per year, and $\mathrm{EF}_{\mathrm{Exhaust}}^{\mathrm{PM10}}$ is the speed-dependent emission factor (in tons/VMT) generated by the MOVES model, which accounts for changes in the vehicle fleet over time, among other factors. The overwhelming majority of unpaved road dust comes from reentrainment of PM_{10} from the physical disturbance of the road surface by vehicles, not from exhaust. That portion of road dust was calculated as:

$$\mathrm{E}_{\mathrm{Reentrainment}}^{\mathrm{PM10}} = \mathrm{VMT} \times \mathrm{EF}_{\mathrm{Reentrainment}}^{\mathrm{PM10}}$$

where $\mathrm{EF}_{\mathrm{Reentrainment}}^{\mathrm{PM10}}$ is an emission factor (in tons/VMT) calculated according to Section 13.2.2 of (EPA, Updated 2006), and which accounts for average vehicle speed and weight as well as road

surface moisture and silt content. The road dust emission factor is not expected to change as a result of the controls described in Chapter D3, except for agricultural roads. The emission factors for some public irrigation roads are expected to be reduced by the controls described in Section D5.2, but those changes are not accounted for explicitly in this budget.

Most of the traffic counts used to determine the VMT for road types, categories and subtypes, and even individual roads were undertaken in January 2013 and January 2014. For Public and Private unpaved roads, ADEQ scaled VMT to better represent 2018 traffic volumes using the equation

$$\mathrm{E}_{2018} = \mathrm{E}_{2013} \times \frac{\mathrm{POP}_{2018}^{\mathrm{County}}}{\mathrm{POP}_{2013}^{\mathrm{County}}}$$

where E_{2018} is the estimated emissions total for 2018, E_{2013} is the estimated emissions total as calculated using the 2013 traffic count, $\mathrm{POP}_{2018}^{\mathrm{County}}$ is the ADOA projection of the population in Pinal county in 2018, and $\mathrm{POP}_{2013}^{\mathrm{County}}$ is the corresponding estimate for 2013[14]. ADEQ did not use this forecasting adjustment on agricultural unpaved roads or on unpaved trails, because their traffic volumes do not necessarily covary with public road traffic volumes. Access to these roads is generally restricted, which is also true of canal roads and roads located on the grounds of industrial/commercial/institutional stationary sources such as vehicle testing facilities or beef cattle feedlots. Emissions from such roads are omitted from the MVEB.

Recall from Table D3-19 that the NA-wide, activity-based emissions from unpaved roads total 37,186.4 TPY in the 2018 attainment scenario. That total breaks down as follows:

Table D4-1. Attainment Scenario Unpaved Road Emissions

Unpaved Road Type	Road Dust (TPY)	Vehicle Exhaust (TPY)	Total (TPY)
Public	17,300.5	1.1	17,301.6
Agricultural (omitted)	9,009.1	0.9	9,009.9
Irrigation (omitted)	1,038.3	0.1	1,038.4
Other Private	9,133.0	0.5	9,133.5
Trails (omitted)	702.9	0.1	702.9
Total	37,183.7	2.7	37,186.4

Taking only the Public and Other Private subtotals from Table D4-1 yields an unpaved road dust budget of 26,433.5 TPY as well as 1.6 TPY of vehicle exhaust.

[14] ADOA projects county populations using 3 different sets of assumptions. ADEQ used projections from the Low Series, because these have been most closely correlated with actual population growth in the county from 2012-2014. ADEQ obtained the Pinal County Detail Table projections for the Low Series from (ADOA, 2015). The forecasting ratio is $\frac{441{,}890}{394{,}066} \approx 112\%$.

D4.1.2 Paved Roads

Paved road PM_{10} emissions were estimated for each of the following sources: exhaust, tire wear, brake wear, bow wake, and physical reentrainment by vehicle travel. The Maricopa Association of Governments (MAG) estimated exhaust, tire and brake wear using the latest onroad emissions model approved by EPA, MOVES2014. The methodology employed by MAG for preparing input files for the MOVES2014 design day and annual inventory modeling were supplied to ADEQ on 10/20/2014, and are presented in Exhibit DII.

PM_{10} generated from the bow wake of large vehicles traveling on roads with unpaved shoulders was calculated using the following emission rate formula $\mathrm{E}_{\mathrm{Bow\ wake}}^{\mathrm{PM10}} = 0.03 \times (S/55)^2$, where $\mathrm{E}_{\mathrm{Bow\ wake}}^{\mathrm{PM10}}$ is the PM_{10} emission rate (in lbs/VMT) and S is the average speed (in miles per hour) for a given roadway segment. The Arizona Department of Transportation (ADOT) generated a map labeling the major roadways in the county with shoulders capable of producing bow wake emissions. The MAG traffic assignment dataset and network were used to calculate bow wake emissions for each road segment specified by ADOT. Bow wake from paved road traffic contributed less than 25 tons of PM_{10} to the 2018 inventory, and so is not considered a significant enough source to include in the MVEB.

Vehicle reentrained road dust emissions were estimated for all MAG-defined road network segments. Annual average emission factors were developed for each road type according to §13.2.1 of (EPA, Updated 2006). Emission rates were scaled by a factor of 381.59% on roadways identified by PCAQCD as trackout hotspots, as described in Section 3.1.1.6 of Appendix B.

Recall from Table D3-19 that the NA-wide, activity-based emissions from paved roads total 1,408.0 TPY in the 2018 attainment scenario. That total is itemized in Table D4-2. Augmenting the exhaust, tire-, and brake-wear subtotal with 1.6 TPY of vehicle exhaust from included unpaved roads yields a total of 173.7 TPY.

Table D4-2. Attainment Scenario Paved Road Emissions

Emissions Type	Annual Emissions (TPY)
Exhaust, tire-, & brake-wear	172.1
Bow wake (omitted)	24.8
Reentrained road dust	1,211.1
Total	1,408.0

D4.1.3 Unpaved Parking Lots

The NA's physical extent was subdivided to represent the primary land use in each area. On three of these land use categories (cleared areas, developed urban lands, and developed rural lands) ADEQ identified disturbed areas which might be used as parking lots. According to (MCAQD, 2011), approximately 24% of such disturbed land is, in fact, parking lots. Using this estimate, ADEQ determined that there were 500 acres of unpaved parking lots in the NA. Following the methodology of (MCAQD, 2011), ADEQ estimated that 251.53 tons of PM_{10} were emitted from these parking lots each year. Because the annual rates in that methodology are not forecasted to change over time, these emissions are omitted from the MVEB.

D4.1.4 Road Construction/Maintenance

The controls discussed in Section D5.2.3.3 include paving, chipsealing, spraying, and graveling unpaved roads. Although these controls are expected to reduce large amounts of unpaved road dust emissions, they will create some additional emissions from the construction required to implement the controls. 15 miles of controls are expected to be installed each year.

ADEQ obtained lists of expected road work projects from ADOT, two planning organizations (MAG and SCMPO), Pinal County, and a variety of municipalities which operate local roads in the NA. 84 of these projects were determined to be likely to occur within the NA between 2016 and 2018. ADEQ estimated appropriate construction emissions for each project according to the methodology in Section 3.2.4 of (Countess Environmental, 2006). Table D4-3 summarizes those emissions for projects which implement the controls listed above.

Table D4-3. Distribution of Public Dirt Road Improvements Planned for the NA, 2016-2018

Control type	Uncontrolled construction emissions factor (tons/acre-month)	Disturbed acre-months planned for				2016-2018 uncontrolled emissions (tons)
		2016	2017	2018	2016-2018 Total	
Gravel/aggregate cover	-	-	-	-	-	-
Synthetic dust palliative	-	-	-	-	-	-
Chip/double chip sealing	0.27	73.31	109.97	39.68	222.96	60.20
Paving	0.42	0.00	14.66	25.88	40.54	17.03
Total		73.31	124.63	65.55	263.49	77.22

The average emission factor for those projects is 0.29 tons/acre-month. The acre wise duration of each chipsealing or paving project is conservatively estimated to be 1.03 months[15]. For each of the 15 miles of construction associated with the rule discussed in Section D5.2.3.3, ADEQ assumed a 73'-wide construction zone[16], so that construction is expected to produce

$$\frac{73\text{ ft}\cdot 5{,}280\text{ ft/mi}}{43{,}560\text{ ft}^2/\text{acre}}\cdot 0.29\text{ tons/acre-month}\cdot 1.03\text{ months}\approx 2.64\text{ tons/mi}$$

of uncontrolled emissions. However, a baseline 22.9% control effectiveness is estimated for the current Pinal County Construction rule (see Section 3.1.1.8 of Appendix B). Thus 2.04 tons of PM_{10} emissions are expected from each mile of additional controls.

[15] Table 3-3 of (Jiang & Wu, 2004) provides a maximum estimate of 33 working days per lane-mile for non-bridge road construction. ADEQ assumed 22 working days per month, to account for weekends, and per Section 3.2.4 of (Countess Environmental, 2006), ADEQ assumed a lane width of 12'. Thus the maximum work duration estimate is $33\text{ working days/lane-mile}\cdot\frac{12\text{ ft/lane}\cdot 5280\text{ ft/mi}}{43560\text{ ft}^2/\text{acre}}\Big/\frac{22\text{ working days}}{1\text{ month}}\approx 1.03\text{ months/acre}$. Although this rate should be regarded as conservative when applied to any non-bridge road construction project, it is especially conservative for chip sealing projects (the most extensively planned control for 2016-2018). Chip sealing generally requires fewer operations than hot mix asphalt paving, and can often be completed without interruption due to Pinal County's hot, dry climate; see, e.g., the FHWA National Highway Institute's Chip Seal Best Practices training course.

[16] The typical high-traffic public unpaved road is assumed to be 48' wide, including shoulders, and Section 3.2.4 of (Countess Environmental, 2006) recommends adding 25' beyond the road area to the construction footprint.

Across all 84 projects—not just those implementing the controls discussed above—a controlled total of 163.5 tons of PM_{10} are expected to be emitted, 59.6 tons of which are expected in 2018[17]. 7.6 miles of projects in that 2018 total implement controls discussed above. As discussed in Section D5.2.3.3, ADEQ estimates that 14.9% of those projects will overlap the 15 mile subtotal. Thus, to avoid double counting, only $15\ \mathrm{mi} - (14.9\% \cdot 7.6\ \mathrm{mi}) \approx 13.9\ \mathrm{mi}$ of additional projects are accounted for, totaling $2.04\ \mathrm{tons/mi} \cdot 13.9\ \mathrm{mi} \approx 28.4\ \mathrm{tons}$ of PM_{10} in 2018. For modeling purposes, these emissions were spread uniformly over the roads which are candidates for the additional projects (unpaved public roads classified as Class D or Class E).

Together with the 59.6 tons already planned, 88.1 tons of emissions are expected altogether. However, as discussed below, the road construction budget allocation is higher than 88.1 TPY.

D4.2 Allowances

In order to leave as much room for growth in the MVEB as possible, ADEQ revised the 2018 inventories (both baseline and attainment) to include additional road work emissions. ADEQ scaled up the emissions rates from each road work project in the inventory until the model no longer showed attainment. At a growth factor of 91.4%, each design day still showed attainment. This was true even when substituting the projects expected for 2016 or 2017 into the modeling, rather than the 2018 projects. However, at 91.5%, the PCH stagnation design day model (using the 2018 projects) showed an exceedance. Thus, ADEQ used the 2018 projects (rather than those planned for 2016 or 2017) in developing the budget, and added 91.4% more road work emissions to the 2018 inventories, to budget for potential unforeseen road work increases. Note that this analysis relied on assumptions about the placement and timing of hypothetical construction projects. Therefore, the success of this budget in protecting the NAAQS will require hotspot modeling to predict the impact of each new project based on its actual location and timing.

Table D4-4. MVEB Summary

Source	Annual NA-Wide Emissions (TPY)
Exhaust, tire-, & brake-wear	173.7
Unpaved road dust	26,433.5
Reentrained paved road dust	1,211.1
Road construction/maintenance	168.8
Total	27,987.1

Even beyond road work inflation, the projected emissions from road work and road dust are intended to be overestimates, leaving significant room for additional growth in motor vehicle traffic. This is because they disregard the substantial reductions described in Section D5.2, which are set aside as contingency measures to offset any PM_{10} emissions beyond those accounted for in the above methodology.

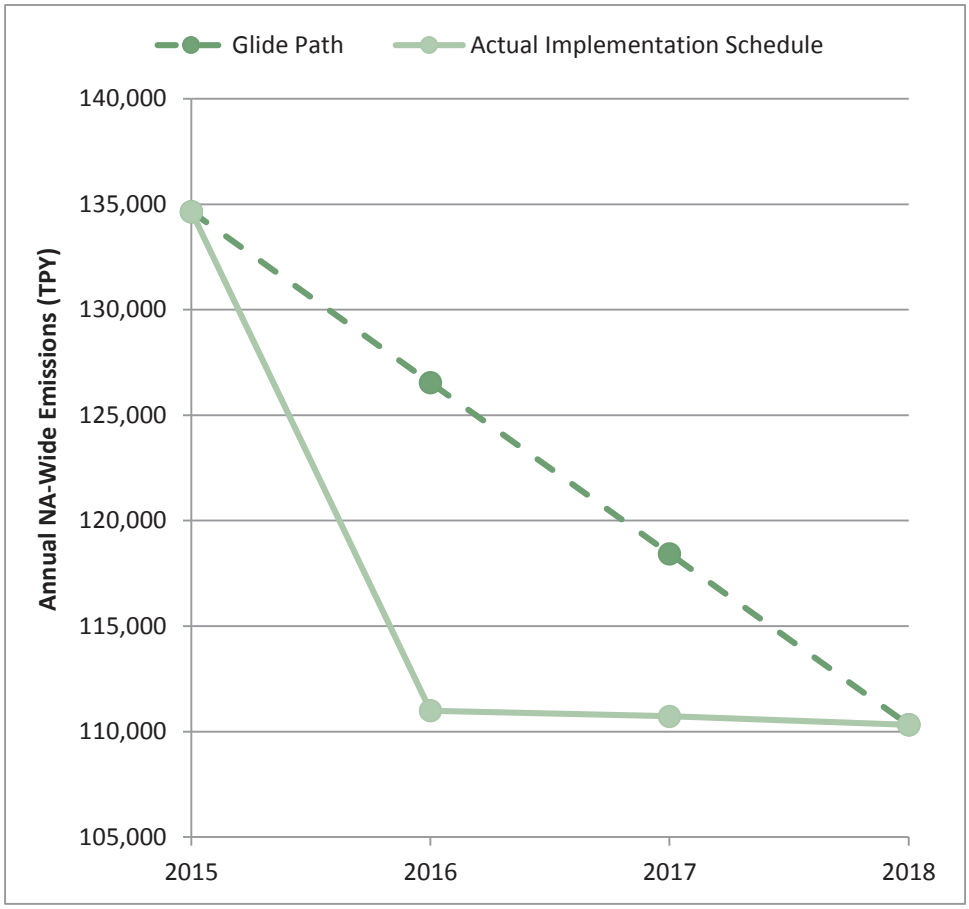
[17] Section D4.2 explains why 2018 construction was used for the budget.

D5 Reasonable Further Progress

D5.1 Implementation Schedule

Recall from Section D3.2 that NA-wide reductions from the base 2018 annual inventory to the attainment inventory totaled 22,426.3 TPY. With a three-year horizon from present (2015) to modeled attainment (2018), a linear implementation schedule would require annual reductions of $\frac{22{,}426.3}{2018-2015} = 7{,}475.4$ TPY. Since the provisions of the AgBMP Rule are effective beginning January 1, 2016, the actual implementation schedule is heavily front-loaded, keeping the NA well below the linear glide path, as illustrated in Figure D5-1.

Figure D5-1. West Pinal PM_{10} NA RFP Schedule



D5.2 Contingency Control Measures

In addition to the attainment reductions, the NA must be able to implement an additional average year's worth of controls—achieving an additional 7,475.4 of reductions—by 2018, in case the attainment controls do not produce the expected reductions at the monitors. However, in an effort to reach attainment as expeditiously as practicable, all of these additional controls will be

implemented proactively. The following sections describe the assumptions and methodology used to estimate the pursuant reductions. Those estimates are summarized in Table D5-1. Note that the total, 7,814.5 TPY, satisfies the 7,475.4 TPY requirement.

Table D5-1. Summary of Contingency Measure Reductions

Rule	Controlled Dust Sources	Implementation date	NA-Wide 2018 Reductions (TPY)
Arizona Administrative Code, R18-2-611.03	Commercial dairy operations	January 1, 2016	101.2
PCAQCD Code of Regulations, §4-3-160, -170, -180, and -190	Permitted construction projects	January 1, 2016	4,691.7[18]
PCAQCD Code of Regulations, §4-1-010, -015, -020, -030, -040, -045, -050, and -060	Several prescribed area sources of fugitive dust, including vacant lots and other open areas, roads, and other traffic areas.	Effective January 1, 2016, with some controls being implemented progressively	3021.7
Total			7,814.5

D5.2.1 Ag BMP Rule Dairy Provision

Recall that the reductions derived in Section D3.1.2 were not credited towards the attainment inventories. The 65.4 TPY of windblown dust and 35.8 TPY of activity-based emissions reduced by the controls on commercial dairy operations are instead counted as contingency measures.

D5.2.2 Pinal County Construction Rule

The new construction rule for Pinal County replaces an existing rule which was taken into account in the base scenario. Based on inspection and compliance history discussed in Section 3.1.1.8 of Appendix B, ADEQ assigned the baseline rule 80% rule effectiveness, near the middle of "Non-point source Rule Effectiveness Range 2" (70% to 85%) in (EPA, 2005). Because of the more stringent recordkeeping and reporting requirements imposed in §4-3-180.C, the new rule is assigned an effectiveness of 85%, at the top of Range 2. The Rule penetration, as calculated in Section 3.1.1.8 of Appendix B for the old rule, remains at 99.48% for the new rule.

The reductions from this rule are accounted for in two parts. Reductions due to the trackout provision are calculated in Section D5.2.2.1, together with reductions due to similar controls from the general fugitive dust rule. Reductions due to the remaining construction rule provisions are discussed in Section D5.2.2.2.

[18] Up to 5 TPY of reductions attributed to the construction rule may actually be attributable to the general fugitive dust rule instead, but were consolidated in the construction rule subtotal as an expediency. See Sections D5.2.2.1 and D5.2.3.4 for details.

D5.2.2.1 Trackout Controls

Since the rule penetration of 99.84% applies to dust emitted directly from construction sites, it cannot be applied to trackout emissions, which are a subset of reintrained paved road dust. Of the 84.8 TPY of reintrained road dust from roads identified as trackout hotspots, 75.0 TPY are emitted on roads adjacent to agricultural land. ADEQ therefore assumed that the trackout on those roads was attributable to agriculture (not construction). However, the other 9.8 TPY are not necessarily all attributable to trackout from construction sites. Therefore, this discussion will take into account both the controls required in §4-3-180.B.1 for construction sites and those discussed in Section D5.2.3.4 (which apply to the remainder of the 9.8 TPY subtotal). Combined, these rules have a penetration of $\frac{9.8\ \mathrm{TPY}}{84.8\ \mathrm{TPY}} = 11.5\%$ with respect to trackout emissions. To be conservative, ADEQ used the lower of the two rule effectivenesses, 69%.

When effectively implemented, trackout controls (in the case of the construction rule) and trackout removal (in some construction cases and all cases covered by the general fugitive dust rule) would reduce silt loading on paved roads to what they would have been in the absence of trackout. Section 3.1.1.6 of Appendix B provides the emission factors used to calculate reintrained road dust emissions at trackout hotspots (2.63 g/mi) and elsewhere (0.69 g/mi). The overall control efficiency is estimated as $\frac{2.63\ \mathrm{g/mi} - 0.69\ \mathrm{g/mi}}{2.63\ \mathrm{g/mi}} = 73.8\%$, so that the collective reductions due to these two provisions are about $11.5\% \cdot 69\% \cdot 73.8\% \cdot 84.8\ \mathrm{TPY} = 5.0\ \mathrm{TPY}$. Because this is a small subtotal relative to the overall reductions for each rule, and because the portion that should be attributed to each rule is unknown, ADEQ has arbitrarily decided to group all 5 tons in with the construction rule total, for bookkeeping simplicity.

D5.2.2.2 Other Provisions

Additional controls within the construction rule target the stabilization of land to reduce windblown dust emissions and measures to reduce emissions from non-wind dust generating operations within a work site. Under section 4-3-180.A. the rule requires that no dust generating operations exceed 20% opacity on the work site and that all disturbed surface areas are stabilized to a level which passes the drop ball test. ADEQ assumes this section of the rule will require control methods equivalent to or greater than the control efficiency water application would achieve on lands that have previously been or are actively being disturbed. Additionally, ADEQ assumed vehicle speed reductions onsite to 15 mph and access restrictions to the site, in line with additional requirements of the rule. Relying upon these controls as the minimum controls necessary to meet the rule requirements, ADEQ used the following methodology to estimate control efficiency.

Activity Construction Control Efficiency Calculation

Uncontrolled construction emissions were calculated utilizing a construction site wide emission factor. As such, it is difficult to separate the impacts of individual controls required in §4-3-180. In order to better represent the emission reductions associated with the implementation of §4-3-180, ADEQ resolved construction site emissions to individual dust generating operations or emitting sources within a construction site. First, research was performed to determine the

availability of literature resolving construction site emissions to individual emitting sectors. ADEQ was able to identify a California power plant expansion plan that resolved construction emissions by emitting activities[19]. The emission distribution from a project of this scale will differ from much smaller, local construction projects found within Pinal County; however, in the absence of more adequate information, ADEQ assumed the emission distribution reported in this analysis is scalable for construction work performed within the nonattainment area. Table D5-2 reports the emitting activities and the distribution of emissions for the California Power Plant expansion. From this emission distribution, ADEQ determined that 2% of construction site emissions were uncontrollable by §4-3-180 as they originated from combustion emissions. ADEQ reviewed the remaining emission sources to determine which control measures defined in §4-3-180 would be applicable. These remaining sources were split into two general emission generation categories: 1) emissions from travel on construction sites, and 2) emissions from construction or earthmoving activities.

Given knowledge of control implementation within the Maricopa County PM_{10} nonattainment area, ADEQ assumes that water is the most likely control for earthmoving activities and for ground stabilization following earthmoving activities. Additional ground stabilizers that are acceptable under the rule include chemical stabilizers; however, these stabilizers cost more to the site operator and are, thus, less likely to be implemented as a control. As such, ADEQ assumed that all dust generating operations and ground stabilization would rely on watering. The type of watering control assigned to each emitting activity was dependent on which of the two general emission generation categories, previously described, an operation belonged. Emissions from travel on construction sites were assumed to be controlled by unpaved road watering, reduced vehicle speed, and access restriction; while emissions from construction or earthmoving activities were assumed to be controlled by either pre-watering or operational watering. As reported in Table D5-3, pre-watering/operational watering was assumed to have a control efficiency of 61%[20]. The control efficiency of 69% for construction site traffic related emissions was calculated by ADEQ utilizing the AP-42 unpaved road equation[21] amongst other resources.

ADEQ calculated control efficiency for construction site traffic related emissions by first assuming that the emissions would be subject to three primary controls: 1) watering of traffic areas to meet stabilization and 20% opacity requirements, 2) reduced vehicle speeds, and 3) access restriction to unauthorized vehicles. ADEQ calculated the emission reductions associated

[19] (L.S. Power South Bay, 2006)

[20] Reported in (Countess Environmental, 2006) in Table 3-7 as the control efficiency for test series 701 from MRI (2001), assuming a 3.2-hour watering interval.

Table D5-2. Resolved Construction Site Emissions

Emission Type	Equipment	No. of Units	Daily Process Rate Per Unit	Total Process Rate	Process Rate Units	PM_{10} Emission Factor (lbs/unit)	Uncontrolled PM_{10} Emissions (lbs/day)	Fraction of Site Emissions (%)
Combustion Emissions	SUB-TOTAL						4.4	2.0%
Fugitive Dust	Excavator/Backhoe	2	504.0	1,008.0	tons	0.0015	1.5	0.7%
	Truck, Flatbed, Ford - Unpaved Road Travel	3	2.2	6.6	vmt	1.4328	9.5	4.4%
	Dozer	2	8.0	16.0	hr	0.4194	6.7	3.1%
	Truck, Concrete Pump - Unpaved Road Travel	2	9.0	18.0	vmt	2.9806	53.7	24.9%
	Excavator/Loader, Cat 936 F	1	588.0	588.0	tons	0.0001	0.1	0.0%
	Excavator/Loader, Cat 938 F	1	588.0	588.0	tons	0.0001	0.1	0.0%
	Truck, Water - Unpaved Road Travel	1	13.4	13.4	vmt	2.8400	38.1	17.6%
	Truck, Fuel/Lube - Unpaved Road Travel	3	6.7	20.1	vmt	2.1349	42.9	19.9%
	Truck, Articulating - Unpaved Road Travel	1	16.5	16.5	vmt	2.9806	49.2	22.8%
	Truck, Articulating - Unloading	1	1,176.0	1,176.0	tons	0.0001	0.1	0.1%
	Excavator/Mtr Grdr	1	13.4	13.4	vmt	0.2754	3.7	1.7%
	Delivery Truck Unpaved Road Travel	13.1	0.2	2.6	vmt	2.3088	6.1	2.8%
	SUB-TOTAL						211.5	98.0%
TOTAL							215.9	100.0%

Adapted from Table 8.1F-2, *Daily and Annual Dust Emissions*, from (L.S. Power South Bay, 2006)

Table D5-3. ADEQ Assumed Controls and Efficiencies for Construction Site Operations

Emission Type	Equipment	Fraction of Site Emissions (%)	Assumed Control Measure	Control Efficiency (%)
Combustion Emissions	SUB-TOTAL	2.04%	N/A	0%
Fugitive Dust	Excavator/Backhoe	0.70%	Pre-Wetting / Operational Watering	61%
	Truck, Flatbed, Ford - Unpaved Road Travel	4.38%	Reduce Vehicle Speed / Watering / Access Restriction	69%
	Dozer	3.11%	Pre-Wetting / Operational Watering	61%
	Truck, Concrete Pump - Unpaved Road Travel	24.85%	Reduce Vehicle Speed / Watering / Access Restriction	69%
	Excavator/Loader, Cat 936 F	0.03%	Pre-Wetting / Operational Watering	61%
	Excavator/Loader, Cat 938 F	0.03%	Pre-Wetting / Operational Watering	61%
	Truck, Water - Unpaved Road Travel	17.63%	Reduce Vehicle Speed / Watering / Access Restriction	69%
	Truck, Fuel/Lube - Unpaved Road Travel	19.88%	Reduce Vehicle Speed / Watering / Access Restriction	69%
	Truck, Articulating - Unpaved Road Travel	22.78%	Reduce Vehicle Speed / Watering / Access Restriction	69%
	Truck, Articulating - Unloading	0.05%	Pre-Wetting / Operational Watering	61%
	Excavator/Mtr Grdr	1.71%	Pre-Wetting / Operational Watering	61%
	Delivery Truck Unpaved Road Travel	2.80%	Reduce Vehicle Speed / Watering / Access Restriction	69%
	SUB-TOTAL	97.96%	-	-
TOTAL		100.00%	Site Fraction Weighted CE (%)	68%

with the first two controls by utilizing the AP-42 unpaved reentrained road dust equation[21]. ADEQ assumed soil moisture content would increase from a native, uncontrolled 0.3% to an average soil moisture of 12%[22]. Utilizing the dry-down soil moisture curve reported by (Midwest Research Institute, 2001) for test series 701, this assumes watering of traffic areas every 1.5 hours of the work day. Additionally, ADEQ assumed onsite vehicle speed would reduce to 15 mph in accordance with R4-3-170.4. For each hour of the day, ADEQ calculated an emission rate using the AP-42 unpaved road equation. This emission factor was averaged for the 10 hour work day and compared to an uncontrolled emission factor to reveal 66% control efficiency. Additionally, ADEQ assumed 3% control efficiency for access restriction of unauthorized vehicles, in line with the 1-3% reduction reported for this control on unpaved agricultural roads in (ADEQ, 2001). 3% was utilized in this case as construction sites are assumed to occur with more regularity in urban areas than agricultural sites (which assumed 2% control efficiency), and thus are assumed to experience a higher amount of unauthorized traffic. These combined controls were calculated to result in estimated control efficiency for traffic related emissions of 69%.

ADEQ then calculated emission-weighted control efficiency for the site of 68% (see Table D5-3). This was the overall control efficiency assumed for construction sites following the implementation of §4-3-180.

Windblown Construction Control Efficiency Calculation

ADEQ did not take credit for controlled windblown dust emission reductions from road construction. Therefore, this sector will not be discussed in this section or subsequent construction sections reviewing windblown dust emissions.

A suite of wind-speed-dependent emission factors for stabilized and disturbed lands were developed for calculation of emissions from these lands throughout the year (discussed in Section 3.1.2 of Appendix B). Windblown emissions from a given construction site for any particular hour are thus dependent on: 1) the average wind speed for that hour, 2) the acreage of the construction site, and 3) the type of construction occurring on a given site. The assumed uncontrolled disturbed to stabilized ratios for each construction type are listed in Table D5-4.

Table D5-4. Uncontrolled Construction Site Disturbance Ratios

Construction Type	Percentage of Construction Site	
	Disturbed	Stabilized
Residential	84%	16%
Site Development	91%	9%
Commercial	100%	0%

[21] See Section 13.2.2 of (EPA, Updated 2006).

[22] Series 701 data presented in (Midwest Research Institute, 2001) exhibited meteorological characteristics that most reasonably resemble Pinal County. This series also showed a drastic decrease in control efficiency 1.5 hours after watering. ADEQ anticipates this control efficiency reduction will not allow compliance with the 20% opacity standard, requiring water re-application every 1.5 hours for traffic areas during operating hours. The average soil moisture over this 1.5 hour dry-down is 12%.

§4-3-180.A.2 requires that all disturbed surface areas on a work site must be stabilized. As such, ADEQ altered the disturbance to stabilization ratios listed in Table D5-4 so that sites were fully stabilized (except where rule penetration or rule effectiveness reduced the percentage of land undergoing stabilization, discussed below).

Rule Penetration Calculation

GIS maps of 2008 permitted construction sites supplied by PCAQCD were analyzed to determine how many permitted construction sites would exceed the rule-defined lower limit of 0.1 acres for earthmoving activities requiring a construction permit, and thus subject to the new rule (§4-3-170.28). 2,668 construction sites were identified from the GIS layer. Of these, only 14 were found to be smaller than 0.1 acres. Therefore, ADEQ assumed a rule penetration of 99.48% (*i.e.*, 99.48% = 1 – 14/2,668).

Rule Effectiveness Estimation

As described at the beginning of Section D5.2.2, estimated rule effectiveness for construction sites subject to §4-3-180 is 85%.

Control Effectiveness Calculation

Control Effectiveness is calculated as the product of control efficiency, rule penetration, and rule effectiveness. Therefore activity construction emissions were calculated to have a rule effectiveness of 57.2% (*i.e.*, 57.2% = 67.6% * 99.5% * 85.0%). Windblown control effectiveness utilizes the same basic methodology; however, instead of the control effectiveness being directly applied to emissions, it was utilized to determine the percentage of disturbed lands that should be converted to stabilized lands. Using this approach, control efficiency is assumed to be 100% (*i.e.*, all disturbed lands are converted to stable lands, in accordance with rule requirements). Therefore, calculated control effectiveness for windblown emissions is 84.6% (*i.e.*, 84.6% = 100.0% * 99.5% * 85.0%). The percentage of disturbed land associated with each construction site type was reduced by 84.6% so that revised disturbed to stabilized land ratios were those reported in Table D5-5. Please note that this does not result in a flat 84.6% reduction in emissions. Total emission reductions are dependent on the ratios listed in Table D5-5, the area of land associated with each construction type, and the meteorological activity in the area of interest (particularly, wind speed for the area and time of interest).

Table D5-5. Controlled Construction Site Disturbance Ratios

Construction Type	Percentage of Construction Site	
	Disturbed	Stabilized
Residential	13%	87%
Site Development	14%	86%
Commercial	15%	85%

Control Effectiveness Application

As construction emission reductions were only credited towards contingency requirements, emission reductions were only calculated at the annual nonattainment area-wide scale. Activity

emissions were reduced by the control effectiveness reported above by multiplying the uncontrolled construction site specific emissions by 0.428 (*i.e.*, 0.428 = 1 - 0.572).

Construction windblown emission reductions were calculated on the annual scale for the nonattainment area by alteration of the disturbed to stable land ratio of uncontrolled construction projects. Uncontrolled construction projects are assumed to have the disturbed to stable ratios listed in Table D5-4. Please note that these disturbance ratios do not represent those used in the base 2018 emission inventory, as this emission inventory assumed control of construction sites by previous Pinal County construction rule. The ratios in Table D5-4 were adjusted by 84.2%, resulting in the ratios reported in Table D5-5. These ratios were then applied to individual construction sites. Uncontrolled stable and disturbed windblown dust emission factors were then utilized to calculate windblown dust originating from controlled construction sites within the nonattainment area for 2018.

Annual Emission Inventory Reductions

As previously noted, construction operation controlled emission reductions were credited towards contingency measure requirements. Table D5-6 presents the calculated annual nonattainment area-wide emission reductions for the year 2018. As this control was utilized for contingency purposes, design day emission reductions were not analyzed.

Table D5-6. 2018 Annual Emission Reductions Estimated for Construction Controls

Emissions	Construction Type	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)	Emission Reductions (TPY)
Activity	Residential	411.9	228.7	183.2
	Commercial	3,274.3	1,817.7	1,456.6
	Site Development	4,644.7	2,578.4	2,066.3
	Road	168.8	93.7	75.1
	Sub-Total	8,499.8	4,718.5	3,781.3
Windblown	Residential	837.5	430.5	407.0
	Commercial	441.4	216.3	225.1
	Site Development	552.2	278.9	273.3
	Sub-Total	1,831.1	925.7	905.4
Total		10,330.9	5,644.2	4,686.7

D5.2.3 Pinal County General Fugitive Dust Rule

Unlike the construction rule, the general fugitive dust rule for Pinal County does not replace a comparable rule. Because there was no predecessor, there is no compliance history on which to base the rule effectiveness. Therefore, the rule effectiveness was conservatively assumed to be in the lowest interval specified for non-point sources in Attachment 2 of (EPA, 2005), Range 3 (less than 70%). To acknowledge the recordkeeping/compliance requirements in §4-1-040, -50, and -60 of the rule, ADEQ selected 69% (the highest whole number percentage in Range 3) as the rule effectiveness for this provision.

D5.2.3.1 Requirements for Owners of Open Areas or Vacant Lots

The open area and vacant lot provision of the Fugitive Dust Rule (§4-1-030.2) prescribes several control options for stabilizing the disturbed portions of undeveloped or partially developed areas 1 acre or larger which hold at least 0.5 disturbed acres.

Explicit exemptions to this provision include vacant or open portions of agricultural land (exempted from this rule by §4-1-015.3, but controlled by the rules described in Section D3.1) and construction sites (exempted in §4-1-015.4, and instead subject to the controls described in Section D5.2.2.2). ADEQ therefore restricted its analysis of open areas and vacant lots to the Developed Urban, Developed Rural, Cleared Area, and Desert Shrubland land use types, excluding the various land use types associated with agriculture or construction, as well as roads and the Other category.

ADEQ examined maps of parcels throughout the NA[23], and used GIS to identify the predominant land use type of each parcel. For each land use type, ADEQ then identified the minimum parcel size required to hold a lot with 0.5 disturbed acres, assuming that the disturbance level for the land use type (*e.g.*, 5% for Developed Rural) was uniform across each parcel that it dominated. For example, for Developed Rural parcels, the minimum sufficient size was $\frac{0.5 \text{ acres}}{5\%} = 10 \text{ acres}$. Table D5-7 shows the thresholds for each included land use categories, and compares the total acreage of parcels in each category with the subtotal for parcels of qualifying size[24]. For each category, the rule penetration was calculated as the proportion (by area) of qualifying parcels.

Table D5-7. Open Area and Vacant Lot Emissions Reductions

Land Use Category	Uncontrolled Disturbance Level	Min. Qualifying Parcel Size (acres)	Parcels (acres)		Rule Pene-tration	Rule Effect-iveness	Controlled Disturbance Level	2018 NA-wide Emissions Reductions (TPY)
			Total	Qualifying				
Developed Urban	2.50%	20.0	19,121.7	4,517.2	23.62%	69.00%	2.09%	33.8
Developed Rural	5.00%	10.0	20,025.1	1,916.5	9.57%	69.00%	4.67%	25.5
Cleared Area	15.00%	3.3	3,020.8	2,580.2	85.41%	69.00%	6.16%	114.5
Desert Shrubland	5.00%	10.0	469,304.4	141,236.3[24]	30.09%	69.00%	3.96%	1,554.2
Total			511,472.0	150,250.1				1,727.9

[23] Digital plat maps were provided by the Pinal County Assessor's Office on May 14, 2015.

[24] Because the primary enforcement targets are likely to be determined based on complaints, it is unlikely that controls will be applied to Desert Shrubland parcels in unincorporated areas (which tend to be sparsely populated, relative to municipalities). Although this last point speaks to rule effectiveness, it is more easily incorporated into GIS-based calculations; Desert Shrubland parcels which were not inside of municipal boundaries were excluded from the qualifying acreage subtotal. For Developed Urban/Rural and Cleared Areas, this criterion was not considered; only parcel size was used to determine qualification.

Taking into account the rule penetration and rule effectiveness, ADEQ adjusted the proportion of each land use category which was disturbed. For example, Developed Rural Land, with a rule penetration of 9.57%, had $9.57\% \cdot 69\% \cdot 5\% = 0.33\%$ of its total area stabilized, *i.e.*, its disturbance level reduced to $5\% - 0.33\% = 4.67\%$ and its stable level increased to $95\% + 0.33\% = 95.33\%$. The revised disturbance levels and the pursuant windblown dust reductions are summarized in Table D5-7.

D5.2.3.2 Requirements for Operators of Unpaved Lots

The unpaved lot provision of the Fugitive Dust Rule (§4-1-030.3) prescribes several control options for unpaved parking lots, unpaved vehicle storage areas, unpaved material transfer stations, or similar traffic areas. One of these controls must be implemented to stabilize the unpaved lot if its size exceeds 5,000 square feet regardless of location and ownership, except in the case of agricultural land (exempted from this rule by §4-1-015.3, but controlled by the rules described in Section D3.1) and construction sites (exempted in §4-1-015.4, and instead subject to the controls described in Section D5.2.2). ADEQ therefore restricted its analysis of unpaved lots to the Developed Urban, Developed Rural, and Cleared Area land use types, excluding the various land use types associated with agriculture or construction, as well as Desert Shrubland (which does not cover any large traffic areas) and roads (which do not include staging/parking areas). The Other category was also excluded.

ADEQ estimated the unpaved parking lot emissions from each of these land use categories separately, as summarized in Table D5-8. A separate rule penetration was calculated for each land use category, as follows. ADEQ examined maps of parcels throughout the NA[23], and used GIS to identify the parcels whose land use type was, for example, predominantly Cleared Area. About 3,021 acres of such parcels were identified, 3,001 acres (or 99.35%) of which were at least 5,000 square feet—large enough to contain a parking lot to which the rule applies. The rule penetrations for Developed Urban and Developed Rural Lands were calculated in the same way, and are summarized in Table D5-8. The average rule penetration, weighted by uncontrolled emissions, is about 99.04% for activity-based emissions and about 98.93% for windblown dust.

Table D5-8. Summary of Uncontrolled Emissions from Unpaved Lots

Land Use Category	Unpaved Lots (acres)	Uncontrolled Emissions (TPY)		Rule Penetration
		Activity-Based	Windblown Dust	
Developed Urban	142.5	48.5	47.2	96.09%
Developed Rural	261.2	131.3	108.4	99.96%
Cleared Areas	96.5	71.7	54.0	99.35%
Total	500.2	251.5	209.5	-

To provide a conservative estimate, ADEQ assumed that lot operators would opt for the least effective among the prescribed controls. For both activity (46% control efficiency[25]) and windblown (45% control efficiency[26]) emissions, this control was gravel. Thus, this provision is estimated to reduce $99.04\% \cdot 69\% \cdot 46\% \cdot 251.5\ \text{TPY} \approx 79.0\ \text{TPY}$ of activity-based emissions and $98.93\% \cdot 69\% \cdot 45\% \cdot 209.5\ \text{TPY} \approx 64.4\ \text{TPY}$ of windblown dust, or 143.4 TPY altogether.

D5.2.3.3 Requirements for Operators of Unpaved Roads

The unpaved road provision of the Fugitive Dust Rule (§4-1-030.4) prescribes several control options for public unpaved roads, listed in Table D5-9. In its transportation conformity consultation process, ADEQ compiled a list of public road work projects planned for the NA in 2016-2018, as described in Section D4.1.4. Of those projects, ADEQ identified which ones implemented controls on the prescribed list. ADEQ tabulated the number of miles on which each control would be implemented. Using the distribution of controls in that sample (weighted by 2016-2018 total miles), ADEQ calculated the average control efficiencies. The weighted average control efficiencies are about 97.1% for activity based emissions and 53.7% for windblown dust, similar to the control efficiencies for chip/double chip sealing, the most popular control category among the currently planned 2016-2018 projects.

Table D5-9. Distribution of Public Dirt Road Improvements Planned for the NA, 2016-2018

Control type	Control efficiency		Miles planned to be implemented in				
	Activity-based	Wind-blown	2016	2017	2018	2016-2017 Subtotal	2016-2018 Total
Gravel/aggregate cover	46.00%[25]	45.00%[26]	0.00	0.00	0.00	0.00	0.00
Synthetic dust palliative	73.00%[27]	45.93%[28]	3.50	0.00	0.00	3.50	3.50
Chip/double chip sealing	99.86%[29]	54.55%[28]	6.00	11.25	6.60	17.25	23.85
Paving	99.86%[30]	54.55%[28]	2.50	3.20	1.00	5.70	6.70
Total	-	-	12.00	14.45	7.60	26.45	34.05

The provision covers unpaved, public roads which carry over 150 one-way vehicle trips per day (abbreviated as "ADT" for "average daily traffic"). ADEQ considered two functional classes of unpaved public roads which carried over 150 ADT, labeled "Class D" and "Class E" roads. With identical surface characteristics and comparable average vehicle speeds, the primary difference between these classes (for the purpose of calculating road dust emissions for a given mile of road) are that Class E roads carry a much higher traffic volume, and so emit more than triple the amount of dust emitted from a Class D road, on a per-mile basis[31]. To be conservative, therefore, ADEQ assumed that the controls would be installed on Class D roads.

[25] (SJVAPCD, 2006)
[26] (Li, Liu, & Gong, 2001)
[27] (ADEQ, 2010)
[28] For road work projects, ADEQ used lane- and shoulder-width assumptions for Groups 1-3 in Table 3-3 of (Countess Environmental, 2006), which collectively correspond to the Class C-E public road designations used in this document. Each travel lane was assumed to be 12 feet wide, with 10 foot wide shoulders. To be conservative, ADEQ assumed that each road would have just two lanes, so that road controls applied to the travel lanes only cover 54.55% of the road surface. Thus, both paving and chip or double chip sealing—which eliminate windblown dust from the travel lanes—have an average control efficiency of 54.55%. Meanwhile, the windblown dust control efficiency for 100% stabilization is calculated as 84.2% for the NA, on average (see Section D5.2.3.4). Since synthetic dust suppressants must be applied in sufficient quantity to stabilize the travel lanes, their average control efficiency is about $54.55\% \cdot 84.2\% \approx 45.93\%$.
[29] See Appendix A to (Sierra Research, Inc., 2006).
[30] *Ibid*.
[31] See Section 3.1.1.4 of Appendix B

Assuming meteorology and road conditions in 2018 are similar to those in 2008, the AP-42 unpaved road dust emission factor for a Class D road in Pinal County is about 1.35 lbs/vehicle mile traveled (VMT)[32]. ADEQ projects that the typical traffic volume on such a road would be 182 ADT in 2018[33], resulting in an uncontrolled emission factor of nearly 44.8 TPY/mile. The 97.1% control rate, therefore, would reduce approximately 43.5 TPY/mi.

ADEQ did not calculate explicit rule penetration and rule effectiveness for this provision, since Subsection B of the provision determines the amount of uncontrolled emissions to which controls will be applied. The provision as a whole is satisfied when 15 miles of unpaved public road (>150 ADT) are controlled each year. Conservatively, ADEQ assumed that only the 2016 and 2017 controls will be in place in 2018, *i.e.*, that the 2018 controls would not necessarily be implemented until the end of 2018. Therefore, the reduction in 2018 annual emissions due to this provision is provided by 30 miles of controls (15 each from 2016 and 2017).

Among the 34.05 miles of controls sampled in Table D5-9, ADEQ was only able to estimate traffic volumes for 10.75 miles (because those roads pass through modeling domains, they are classified by functional type). Of these, one project spanned 1.6 miles of Peters Road, slightly east of the Stanfield modeling domains. The span of Peters Road within the domains is classified as Class D; the span controlled by this project was assumed to carry a similar traffic volume. The other projects in the 10.75 mile subset were all on Class B and C roads (< 150 ADT). ADEQ therefore assumed that $\frac{1.6\text{ mi}}{10.75\text{ mi}} \approx 14.9\%$ of planned controls from Table D5-9 would be on roads carrying over 150 ADT, and would therefore qualify towards the 15 mile per year total. There are 20 projects planned for 2016-2017, which account for 26.45 of the miles in the table, so about $14.9\% \cdot 26.45\text{ mi} \approx 3.94\text{ mi}$ would be among the 30 miles implemented by 2018.

However, all of the pre-2018 projects in the table (in fact, all of the pre-2018 projects which implement *any* controls, not just those listed in the table) are already considered in the base scenario inventory for 2018[34]. Therefore, they cannot also be credited towards contingency measures. Deducting these 3.94 miles from the 30 mile total leaves 26.06 miles of 2016-2017 controls to be credited towards contingency measures. At a rate of 43.5 TPY/mi, therefore, this provision is expected to reduce 1,133.3 TPY of activity-based unpaved road dust by 2018. The corresponding reduction for windblown dust is 9.4 TPY, for a total of 1142.7 TPY reduced by this provision of the rule.

Note that this brings the contingency reduction total above the needed 7,475.4 TPY. In fact, the 15-mile-per-year requirement could have been several miles lower and still resulted in sufficient expected reductions. However, due to the uncertainty of the 3.94 mile extrapolation, the rule used the conservative[35] 15-mile-per-year total.

---

[32] *Ibid.*

[33] *Ibid.*

[34] See Section 5.1.4 of Appendix B

[35] The 15-mile-per-year level overcomes the uncertainty associated with the 3.94 mile reconciliation figure at the 99% confidence level, as follows. We assume that each of the projects summarized in Table D5-9 have an independent 14.9% chance of covering qualifying road (road carrying over 150 ADT). Then among the 26.45 miles to be completed in 2016-2017, the probability that more than 10.4 miles would cover qualifying road is less than 1%. Therefore, there is more than a 99% chance that at least 19.6 miles would be credited towards the contingency

D5.2.3.4 Requirements for Operators of Paved Public Roads

The paved public road provision of the Fugitive Dust Rule (§4-1-030.5) calls for controls on two sources of paved road dust. Subsection A seeks to reduce reintrained road dust caused by deposition of mud or dirt onto roadways, primarily from trackout. However, agricultural operations are exempted from these trackout controls by §4-1-015.3 (they are instead subject to the trackout controls described in Section D3.1) as are construction projects by §4-1-015.4 (they are instead subject to the trackout controls described in Section D5.2.2.1). For applicable roadways, this subsection requires the prompt removal of trackout and other large deposits of reentrainable material. Although ADEQ has an estimate for the portion of trackout in the NA attributable to agriculture, no such estimate exists for construction. Therefore, ADEQ was not able to disentangle the reductions due to this provision from those attributable to the construction rule. Instead, the trackout reductions from this provision are rolled into the 5 TPY total discussed in Section D5.2.2.1. The reductions due to non-trackout cleanup (for example, the cleanup of material deposited by stormwater) are not quantified.

Subsection B of the rule requires that work which disturbs unpaved road shoulders (*e.g.*, weed control activities) be followed by stabilization of the shoulder surface. For each wind speed bin used in the windblown dust inventory, disturbed and stable emission factors were compared.[36] Table D5-10 shows the reductions associated with switching from the disturbed factor to the stable factor for each bin. The control efficiency for stabilization was calculated as the average reduction across all bins, 84.2%.

Table D5-10. Windblown Dust Emission Factor Reductions

Wind Speed Bin (mph)	Stabilization Reduction	Wind Speed Bin (mph)	Stabilization Reduction	Wind Speed Bin (mph)	Stabilization Reduction
0-11	-	18	82.7%	25	86.7%
12	79.8%	19	82.7%	26	86.7%
13	79.8%	20	85.1%	27	86.7%
14	79.8%	21	85.1%	28	86.7%
15	82.7%	22	85.1%	29	86.7%
16	82.7%	23	85.1%	30	87.9%
17	82.7%	24	85.1%	31+	-

ADEQ evaluated the distribution of land use types (and therefore the disturbed vs. stable proportions) throughout the NA. Using GIS to extract and process a 10-foot buffer[37] surrounding the paved road network, ADEQ calculated that 5.56 TPY of windblown dust originated from the disturbed shoulders of roads through desert shrubland. Similarly, after taking into account previous controls, ADEQ calculated that 2.07 TPY of windblown dust came from disturbed

measure total. Even if this provision only contributed 19.6 miles worth of reductions, *ceteris paribus*, the total reductions would still be 7,531.2 TPY, well above the 7475.4 TPY requirement.

[36] The proportions between disturbed and stable windblown dust emissions factors throughout this inventory are derived from Table A4-6 from Appendix A4 to (MCAQD, 2011).

[37] Per Table 3-3 of (Countess Environmental, 2006), ADEQ assumed that shoulders were typically 10 feet wide on public roads which carry high-speed traffic (Classes 1-3 in that table).

shoulders in developed rural land, 0.81 TPY from those in developed urban land, 0.17 TPY from those in cleared areas, and 3.06 TPY from those passing through the "other" land use category. Altogether, 11.67 TPY of windblown dust emissions were attributed to disturbed road shoulders. These subtotals reflect the emissions from both the disturbed and stable portions of the road shoulders. The rule penetration should therefore single out those emissions which are attributable to disturbed land. However, due to time constraints and the small impact of the stable road shoulder subtotal, ADEQ did not make this adjustment (it will be included in a forthcoming revision of this document). Instead, a rule penetration of 100% is used as a placeholder. Therefore, the overall reductions due to the provision are approximately $100\% \cdot 69\% \cdot 82.4\% \cdot 11.67\ \mathrm{TPY} \approx 6.8\ \mathrm{TPY}$. These reductions are distributed proportionally among the above listed land use categories.

The activity-based emissions from unpaved shoulders are listed as a subtotal of paved road dust, namely Bow Wake. Because the mechanical lifting process in this case is through vehicle's wake in air (which is essentially wind, even if it is man-made), the windblown dust control efficiency is also used for bow wake. The total emissions from bow wake in 2018 are estimated as 24.8 TPY (see Table 5-10 in Appendix B). ADEQ assumed that the high-speed traffic carried on private roads is negligible relative to that carried on public ones, and so attributed 100% of these emissions to public roads. However, only the emissions from disturbed portions of public road shoulders are impacted by this provision, so ADEQ calculated the rule penetration as the proportion of road shoulder which would be disturbed. Assuming that the disturbed vs. stable proportions of the underlying land use category apply to the road shoulders, the disturbed portion was estimated as 5.56% (note that the majority of paved road in the NA passes through developed rural land and desert shrubland, both of which have just 5% disturbed area). Thus overall reductions to bow wake are about $5.56\% \cdot 69\% \cdot 84.2\% \cdot 24.8\ \mathrm{TPY} \approx 0.8\ \mathrm{TPY}$, and the total reductions for the provision as a whole are 7.6 TPY.

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Exhibit DI Agricultural Supplemental Information

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DI1 Agricultural Crop Surveys

Arizona Cotton Growers Association **Pinal County Farm Bureau**

Dear Pinal County Producer:

As you know, EPA has designated the western part of Pinal County as a non-attainment area in which PM10 air quality emissions can create serious health problems. A large number of entities, including agriculture, are now required to adopt measures that will reduce PM10 emissions.

The Arizona Department of Air Quality (ADEQ) and the County are charged with developing a number of Best Management Practices (BMPs) that will allow producers to chose BMPs that will help agriculture reduce their share of PM10 emissions. However, which BMPs are the most effective and which BMPs producers will utilize is a difficult challenge for Pinal County because of the dust issues created in the County's non-attainment area.

We are asking County producers to complete the enclosed survey to help us in crafting a program for Pinal County agriculture that will be effective in reducing PM10 emissions but not create an economic burden. Your name and address will be confidential.

Please complete the survey and return it to us via email to anakennedy@azfb.org or return it by mail to

Arizona Farm Bureau
Attn: Ana Kennedy
325 S. Higley Rd., Ste. 210
Gilbert AZ 85296

If you have any questions regarding the survey you can contact Ana Kennedy at (480)635-3614.

We realize completing the survey will take some time. However, your participation is important as the Agricultural BMP Committee works to design the PM10 control program for Pinal County because ***we don't want the EPA to put their regulations on us, which will be much worse.*** We urge your assistance as it is essential to creating a program that works in Pinal County for agriculture.

Sincerely,

Richie Kennedy
Pinal County Farm Bureau President
President

Dan Thelander
Agricultural BMP Committee Chairman
Committee Chairman

Greg Wuertz
Arizona Cotton Growers
Chairman of the Board

Date:_____ Page Number:____

Agricultural Best Management Practices (AgBMP) Survey– Pinal County

Survey Directions:

1) ***Complete Section A*** of the Survey by providing the following information:
   a. Total farm acreage followed by a break-down of total acreage of crop land, total acreage of fallow land, total acreage of equipment areas/non-cropland and total miles of unpaved roads on the farm. ***Estimated acreage and miles is acceptable.***
   b. Total acres of each crop grown for 2013.

2) ***Complete Section B*** by indicating the Best Management Practice for each crop type you would choose in future years once the BMP program is in place. ***Please use multiple forms if necessary for the various crops selected.*** For more information regarding the specific BMPs, please see the Best Management Practices (BMPs) Definitions document.

3) Return completed survey via email to anakennedy@azfb.org or you may mail the completed survey to Arizona Farm Bureau, Attn: Ana Kennedy, 325 S. Higley Rd., Ste. 210, Gilbert, AZ 85296.

Thank you for your time and cooperation!

Section A:

Total Acreage of Farm Land:_____

Total Acreage of Crop Land: _____

Total Acreage of Fallow Fields:_____

Total Acreage of Equipment Areas/Noncropland:_____

Total Miles of Unpaved Roads:_____

Total Acres of each crop grown:

☐Alfalfa _____☐Vegetables_____☐Corn_____

☐Cotton_____☐Tree Fruits_____☐Ornamental_____

☐Forage_____☐Tree Nuts_____☐Grain_____ ☐ Other_____

Please continue to Section B.

Date:_____ Page Number:____

Section B

Best Management Practices: Please indicate the Best Management Practices you would implement for the specified crop once the BMP program is in place. (Use multiple forms if necessary for each crop grown).

CROP:_____

Tillage:

- ☐ Cessation of Night Tillage
- ☐ Chemical Irrigation
- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Limited Tillage Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Planting Based on Soil Moisture
- ☐ Precision Farming
- ☐ Reduced Tillage System
- ☐ Conservation Tillage
- ☐ Tillage Based on Soil Moisture
- ☐ Timing of Tillage Operation
- ☐ Transgenic Crops
- ☐ Transplanting

Notes:

Harvest:

- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Green Chop
- ☐ Integrated Pest Management
- ☐ Limited Harvest Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Precision Farming
- ☐ Reduced Harvest Activity
- ☐ Transgenic Crops
- ☐ Shuttle System/Large Carrier

Notes:

Cropland:

- ☐ Cover Crop
- ☐ Cross-wind Ridges
- ☐ Chips/Mulches
- ☐ Multi-year Crop
- ☐ Permanent Cover
- ☐ Precision Farming
- ☐ Residue Management
- ☐ Stabilization of Soil Prior to Plant Emergence
- ☐ Sequential Cropping
- ☐ Surface Roughening
- ☐ Wind Barrier

Notes:

Non-Cropland:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Critical Area Planting
- ☐ Organic Material Application
- ☐ Synthetic Particulate Suppressant
- ☐ Watering
- ☐ Wind Barrier

Notes:

Commercial Farm Roads:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Reduce Vehicle Speed
- ☐ Synthetic Particulate Suppressant
- ☐ Track-out Control System
- ☐ Watering
- ☐ Wind Barrier

Notes:

Complete additional Section B if necessary for additional crops.

Date:_____ Page Number:____

Section B

Best Management Practices: Please indicate the Best Management Practices you would implement for the specified crop once the BMP program is in place. (Use multiple forms if necessary for each crop grown).

CROP:_____

Tillage:

- ☐ Cessation of Night Tillage
- ☐ Chemical Irrigation
- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Limited Tillage Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Planting Based on Soil Moisture
- ☐ Precision Farming
- ☐ Reduced Tillage System
- ☐ Conservation Tillage
- ☐ Tillage Based on Soil Moisture
- ☐ Timing of Tillage Operation
- ☐ Transgenic Crops
- ☐ Transplanting

Notes:

Harvest:

- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Green Chop
- ☐ Integrated Pest Management
- ☐ Limited Harvest Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Precision Farming
- ☐ Reduced Harvest Activity
- ☐ Transgenic Crops
- ☐ Shuttle System/Large Carrier

Notes:

Cropland:

- ☐ Cover Crop
- ☐ Cross-wind Ridges
- ☐ Chips/Mulches
- ☐ Multi-year Crop
- ☐ Permanent Cover
- ☐ Precision Farming
- ☐ Residue Management
- ☐ Stabilization of Soil Prior to Plant Emergence
- ☐ Sequential Cropping
- ☐ Surface Roughening
- ☐ Wind Barrier

Notes:

Non-Cropland:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Critical Area Planting
- ☐ Organic Material Application
- ☐ Synthetic Particulate Suppressant
- ☐ Watering
- ☐ Wind Barrier

Notes:

Commercial Farm Roads:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Reduce Vehicle Speed
- ☐ Synthetic Particulate Suppressant
- ☐ Track-out Control System
- ☐ Watering
- ☐ Wind Barrier

Notes:

Complete additional Section B if necessary for additional crops.

Date:_____ Page Number:____

Section B

Best Management Practices: Please indicate the Best Management Practices you would implement for the specified crop once the BMP program is in place. (Use multiple forms if necessary for each crop grown).

CROP:_____

Tillage:

- ☐ Cessation of Night Tillage
- ☐ Chemical Irrigation
- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Limited Tillage Activity During High Wind Events
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- ☐ Conservation Tillage
- ☐ Tillage Based on Soil Moisture
- ☐ Timing of Tillage Operation
- ☐ Transgenic Crops
- ☐ Transplanting

Notes:

Harvest:

- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Green Chop
- ☐ Integrated Pest Management
- ☐ Limited Harvest Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Precision Farming
- ☐ Reduced Harvest Activity
- ☐ Transgenic Crops
- ☐ Shuttle System/Large Carrier

Notes:

Cropland:

- ☐ Cover Crop
- ☐ Cross-wind Ridges
- ☐ Chips/Mulches
- ☐ Multi-year Crop
- ☐ Permanent Cover
- ☐ Precision Farming
- ☐ Residue Management
- ☐ Stabilization of Soil Prior to Plant Emergence
- ☐ Sequential Cropping
- ☐ Surface Roughening
- ☐ Wind Barrier

Notes:

Non-Cropland:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Critical Area Planting
- ☐ Organic Material Application
- ☐ Synthetic Particulate Suppressant
- ☐ Watering
- ☐ Wind Barrier

Notes:

Commercial Farm Roads:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Reduce Vehicle Speed
- ☐ Synthetic Particulate Suppressant
- ☐ Track-out Control System
- ☐ Watering
- ☐ Wind Barrier

Notes:

Complete additional Section B if necessary for additional crops.

Date:_____ Page Number:____

Section B

Best Management Practices: Please indicate the Best Management Practices you would implement for the specified crop once the BMP program is in place. (Use multiple forms if necessary for each crop grown).

CROP:_____

Tillage:

- ☐ Cessation of Night Tillage
- ☐ Chemical Irrigation
- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Limited Tillage Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Planting Based on Soil Moisture
- ☐ Precision Farming
- ☐ Reduced Tillage System
- ☐ Conservation Tillage
- ☐ Tillage Based on Soil Moisture
- ☐ Timing of Tillage Operation
- ☐ Transgenic Crops
- ☐ Transplanting

Notes:

Harvest:

- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Green Chop
- ☐ Integrated Pest Management
- ☐ Limited Harvest Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Precision Farming
- ☐ Reduced Harvest Activity
- ☐ Transgenic Crops
- ☐ Shuttle System/Large Carrier

Notes:

Cropland:

- ☐ Cover Crop
- ☐ Cross-wind Ridges
- ☐ Chips/Mulches
- ☐ Multi-year Crop
- ☐ Permanent Cover
- ☐ Precision Farming
- ☐ Residue Management
- ☐ Stabilization of Soil Prior to Plant Emergence
- ☐ Sequential Cropping
- ☐ Surface Roughening
- ☐ Wind Barrier

Notes:

Non-Cropland:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Critical Area Planting
- ☐ Organic Material Application
- ☐ Synthetic Particulate Suppressant
- ☐ Watering
- ☐ Wind Barrier

Notes:

Commercial Farm Roads:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Reduce Vehicle Speed
- ☐ Synthetic Particulate Suppressant
- ☐ Track-out Control System
- ☐ Watering
- ☐ Wind Barrier

Notes:

Complete additional Section B if necessary for additional crops.

Date:_____ Page Number:____

Section B

Best Management Practices: Please indicate the Best Management Practices you would implement for the specified crop once the BMP program is in place. (Use multiple forms if necessary for each crop grown).

CROP:_____

Tillage:

- ☐ Cessation of Night Tillage
- ☐ Chemical Irrigation
- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Limited Tillage Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Planting Based on Soil Moisture
- ☐ Precision Farming
- ☐ Reduced Tillage System
- ☐ Conservation Tillage
- ☐ Tillage Based on Soil Moisture
- ☐ Timing of Tillage Operation
- ☐ Transgenic Crops
- ☐ Transplanting

Notes:

Harvest:

- ☐ Combining Tractor Operations
- ☐ Equipment Modification
- ☐ Green Chop
- ☐ Integrated Pest Management
- ☐ Limited Harvest Activity During High Wind Events
- ☐ Multi-year Crop
- ☐ Precision Farming
- ☐ Reduced Harvest Activity
- ☐ Transgenic Crops
- ☐ Shuttle System/Large Carrier

Notes:

Cropland:

- ☐ Cover Crop
- ☐ Cross-wind Ridges
- ☐ Chips/Mulches
- ☐ Multi-year Crop
- ☐ Permanent Cover
- ☐ Precision Farming
- ☐ Residue Management
- ☐ Stabilization of Soil Prior to Plant Emergence
- ☐ Sequential Cropping
- ☐ Surface Roughening
- ☐ Wind Barrier

Notes:

Non-Cropland:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Critical Area Planting
- ☐ Organic Material Application
- ☐ Synthetic Particulate Suppressant
- ☐ Watering
- ☐ Wind Barrier

Notes:

Commercial Farm Roads:

- ☐ Access Restriction
- ☐ Aggregate Cover
- ☐ Reduce Vehicle Speed
- ☐ Synthetic Particulate Suppressant
- ☐ Track-out Control System
- ☐ Watering
- ☐ Wind Barrier

Notes:

Please use additional copies of Section B if necessary for additional crops.

Best Management Practices (BMPs) Definitions

Tillage and Harvest BMPs

Cessation of Night Tilling means the discontinuation of night tillage tilling on a day identified by the Maricopa County Dust Control Forecast as being high risk of dust generation.

Chemical irrigation means reducing the number of passes across a commercial farm by applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.

Combining tractor operations means reducing soil compaction and the number of passes across a commercial farm by using a tractor, implement, harvester, or other farming support vehicle to perform two or more tillage, cultivation, planting, or harvesting operations at the same time.

Conservation Tillage means a tillage system that reduces a minimum of three tillage operations. This system reduces soil and water loss by planting into existing plant stubble on the field after harvest as well as managing the stubble so that it remains intact during the planting season.

Equipment modification means reducing PM10 emissions and soil erosion during tillage and harvest operations by modifying and maintaining an existing piece of agricultural equipment, purchasing new equipment, increasing equipment size, modifying land planting and land leveling, matching the equipment to row spacing, or grafting to new varieties or technological improvements.

Green Chop means reducing soil compaction, soil disturbance and the number of passes across a commercial farm by harvesting of a Forage Crop without allowing it to dry in the field.

Integrated Pest Management means reducing soil compaction and the number of passes in a commercial farm for spraying by using a combination of techniques including organic, conventional, and biological farming practices to suppress pest problems.

Limited harvest activity during a high-wind event means performing no harvest or soil preparation activity when the measured wind speed as measured by a hand held anemometer is more than 25 miles per hour at the commercial farm site.

Limited tillage activity during a high-wind event means performing no tillage or soil preparation activity when the measured wind speed as measured by a hand held anemometer is more than 25 miles per hour at the commercial farm site.

Multi-year crop means reducing PM10 emissions from wind erosion or tillage by protecting the soil surface by growing a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.

Planting based on soil moisture means applying water or having enough moisture in the soil to germinate the seed prior to planting.

Precision Farming means reducing the number of passes across a commercial farm by using GPS to precisely guide farm equipment in the field.

Reduced harvest activity means reducing the number of mechanical harvest passes.

Reduced tillage system means reducing the number of tillage operations.

Tillage based on soil moisture means reducing PM10 emissions by irrigating fields to the depth of the proposed cut prior to soil disturbances or conducting tillage to coincide with precipitation.

Timing of a tillage operation means performing tillage operations that minimize the amount of time the soil surface is susceptible to wind erosion resulting in PM10.

Transgenic Crops means reducing the need for tillage or cultivation operations, the number of chemical spray applications, or soil disturbances by using plants that are genetically modified.

Transplanting means reducing the number of passes in a commercial farm and minimizing soil disturbance by utilizing plants already in a growth state as compared to seeding.

Shuttle System/Larger Carrier means reducing the number of passes in a commercial farm by using multiple or larger bins/trailers per trip to haul commodity from the field.

Cropland BMPs

Cover crop means reducing wind erosion and PM10 emissions by using plants or a green manure crop seasonally to protect soil surfaces between crops and control soil movement.

Cross-wind ridges means stabilizing soil and reducing PM10 emissions and wind erosion by creating soil ridges in a commercial farm by tillage or planting operations. Ridges should be aligned as perpendicular as possible to the prevailing wind direction. Soil should be stable enough to sustain effective ridges.

Chips/ mulches means reducing PM emissions and soil movement and preserving soil moisture by applying nontoxic chemical or organic dust suppressants that meet all specifications required by federal, state, or local water agencies, and is not prohibited for use by any applicable regulations.

Multi-year crop means reducing PM10 emissions from wind erosion or tillage by protecting the soil surface by growing a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.

Permanent cover means reducing PM10 emissions and wind erosion by maintaining a long-term perennial vegetative cover on cropland that is temporarily not producing a major crop.

Precision Farming means reducing the number of passes across a commercial farm by using GPS to precisely guide farm equipment in the field.

Residue management means reducing PM10 emissions and wind erosion by managing the amount and distribution of crop and other plant residues on a soil surface between the time of harvest of one crop and the emergence of a new crop.

Stabilization of soil prior to plant emergence means reducing PM10 emissions by applying water to soil in between planting and crop emergence in order to cause the soil to form a crust.

Sequential cropping means reducing PM10 emissions and wind erosion by growing crops in a sequence or close rotation that limits the amount of time bare soil is exposed on a commercial farm to 30 days or less.

Surface roughening means reducing PM10 emissions and wind erosion by manipulating a soil surface in order to produce or maintain clods.

Wind barrier means reducing PM10 emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface.

Non-cropland and Commercial Farm Roads BMPs

Access restriction means reducing the number of trips driven on agricultural aprons and access roads by restricting or eliminating public access to noncropland with signs or physical obstruction.

Aggregate cover means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces.

Wind barrier means reducing PM10 emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface.

Critical area planting means reducing PM10 emissions and wind erosion by planting trees, shrubs, vines, grasses, or other vegetative cover on noncropland in order to maintain adequate ground cover.

Organic material application means applying animal waste or biosolids to a soil surface.

Reduce vehicle speed means reducing PM10 emissions and soil erosion from the operation of farm vehicles or farm equipment on unpaved private farm roads at speeds not to exceed 20 mph.

Synthetic particulate suppressant means reducing PM10 emissions and wind erosion by providing a surface barrier or binding soil particles together on noncropland with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

Track-out control system means reducing PM10 emissions by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road.

Watering means reducing PM10 emissions and wind erosion by applying water to noncropland bare soil surfaces during periods of high traffic until the surfaces are visibly moist.

DI2 Agricultural Crop Control Efficiencies

All control efficiencies utilized in the calculation of agricultural crop control efficiencies are presented below with references. Except where specified in Section D3.1.1, if a crop/BMP combination is not included in this list, it was not reported as a BMP of interest for any farmer surveyed. For those crops that did not have reported control efficiencies by the references utilized, control efficiency is assumed transferrable from lowest crop control efficiency reported for that BMP from the reference cited. Wheat and barley control efficiencies were assumed adequate to use for grain crops. The control efficiencies listed for cropland only control windblown dust. Tillage and harvest control efficiencies listed that do not specify "activity" or "windblown" in the comments section are specific to activity emissions and the corresponding BMP windblown dust control efficiency is assumed to be zero.

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Cropland	Chips / Mulches	Barley	32.5%	San Joaquin	
Cropland	Chips / Mulches	Cotton	32.5%	San Joaquin	
Cropland	Chips / Mulches	Fallow	32.5%	San Joaquin	
Cropland	Chips / Mulches	Vegetables	32.5%	San Joaquin	
Cropland	Chips / Mulches	Wheat	32.5%	San Joaquin	
Cropland	Conservation Tillage	Barley	63%	ADEQ 2001	Assumed 20% ground cover.
Cropland	Conservation Tillage	Cotton	63%	ADEQ 2001	
Cropland	Conservation Tillage	Fallow	63%	ADEQ 2001	
Cropland	Conservation Tillage	Wheat	63%	ADEQ 2001	
Cropland	Cover Crop	Alfalfa	33%	San Joaquin	
Cropland	Cover Crop	Barley	33%	San Joaquin	
Cropland	Cover Crop	Citrus	33%	San Joaquin	
Cropland	Cover Crop	Corn	33%	San Joaquin	
Cropland	Cover Crop	Cotton	33%	San Joaquin	
Cropland	Cover Crop	Fallow	33%	San Joaquin	
Cropland	Cover Crop	Vegetables	33%	San Joaquin	
Cropland	Cover Crop	Wheat	33%	San Joaquin	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Cropland	Cross-wind Ridges	Alfalfa	57%	ADEQ 2010	
Cropland	Cross-wind Ridges	Barley	57%	ADEQ 2010	
Cropland	Cross-wind Ridges	Corn	57%	ADEQ 2010	
Cropland	Cross-wind Ridges	Cotton	57%	ADEQ 2010	
Cropland	Cross-wind Ridges	Fallow	57%	ADEQ 2010	
Cropland	Cross-wind Ridges	Wheat	57%	ADEQ 2010	
Cropland	Permanent Cover	Alfalfa	92%	ADEQ 2001	Calculated 92% CE for residue mgt for 50% surface coverage, SLR method. Li 2007 showed comparable results from field studies.
Cropland	Permanent Cover	Barley	92%	ADEQ 2001	
Cropland	Permanent Cover	Citrus	92%	ADEQ 2001	
Cropland	Permanent Cover	Fallow	92%	ADEQ 2001	
Cropland	Permanent Cover	Wheat	92%	ADEQ 2001	
Cropland	Reduced Tillage System	Alfalfa	63%	Walters & Jasa / ADEQ 2001	Assumed RTS was equivalent to residue management with 20% ground cover.
Cropland	Reduced Tillage System	Barley	63%	Walters & Jasa / ADEQ 2001	
Cropland	Reduced Tillage System	Cotton	63%	Walters & Jasa / ADEQ 2001	
Cropland	Reduced Tillage System	Fallow	63%	Walters & Jasa / ADEQ 2001	
Cropland	Reduced Tillage System	Vegetables	63%	Walters & Jasa / ADEQ 2001	
Cropland	Reduced Tillage System	Wheat	63%	Walters & Jasa / ADEQ 2001	
Cropland	Residue Management	Alfalfa	92%	ADEQ 2001	Calculated 92% CE for residue mgt for 50% surface coverage, SLR method. Li 2007 showed comparable results from field studies.
Cropland	Residue Management	Barley	92%	ADEQ 2001	
Cropland	Residue Management	Corn	92%	ADEQ 2001	
Cropland	Residue Management	Cotton	92%	ADEQ 2001	
Cropland	Residue Management	Fallow	92%	ADEQ 2001	
Cropland	Residue Management	Wheat	92%	ADEQ 2001	
Cropland	Sequential Cropping	Alfalfa	50%	ADEQ 2010	
Cropland	Sequential Cropping	Barley	50%	ADEQ 2010	
Cropland	Sequential Cropping	Citrus	50%	ADEQ 2010	
Cropland	Sequential Cropping	Cotton	50%	ADEQ 2010	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Cropland	Sequential Cropping	Fallow	50%	ADEQ 2010	
Cropland	Sequential Cropping	Wheat	50%	ADEQ 2010	
Cropland	Stabilization of Soil prior to plant emergence	Alfalfa	65%	Calculated	Annual emission CE given, assumes fallow lands --> fully stabilized under 25 mph winds conditions at PCH. This is a conservative approach as many of these lands will be >10% disturbed (assumed disturbance for fallow fields).
Cropland		Barley	65%	Calculated	
Cropland		Cotton	65%	Calculated	
Cropland		Fallow	65%	Calculated	
Cropland		Wheat	65%	Calculated	
Cropland	Surface Roughening	Alfalfa	45%	ADEQ 2010	
Cropland	Surface Roughening	Barley	45%	ADEQ 2010	
Cropland	Surface Roughening	Corn	45%	ADEQ 2010	
Cropland	Surface Roughening	Cotton	45%	ADEQ 2010	
Cropland	Surface Roughening	Fallow	45%	ADEQ 2010	
Cropland	Surface Roughening	Vegetables	45%	ADEQ 2010	
Cropland	Surface Roughening	Wheat	45%	ADEQ 2010	
Harvest	Chemical Irrigation	Alfalfa	2%	San Joaquin	
Harvest	Chemical Irrigation	Barley	7%	San Joaquin	
Harvest	Chemical Irrigation	Citrus	9%	San Joaquin	
Harvest	Chemical Irrigation	Corn	1%	San Joaquin	
Harvest	Chemical Irrigation	Cotton	9%	San Joaquin	
Harvest	Chemical Irrigation	Lettuce	2%	San Joaquin	
Harvest	Chemical Irrigation	Vegetables	2%	San Joaquin	
Harvest	Chemical Irrigation	Wheat	7%	San Joaquin	
Harvest	Combining Tractor Operations	Alfalfa	43%	ADEQ 2001	
Harvest	Combining Tractor Operations	Barley	43%	ADEQ 2001	
Harvest	Combining Tractor Operations	Citrus	43%	ADEQ 2001	
Harvest	Combining Tractor Operations	Corn	43%	ADEQ 2001	
Harvest	Combining Tractor Operations	Cotton	43%	ADEQ 2001	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Harvest	Combining Tractor Operations	Wheat	43%	ADEQ 2001	
Harvest	Conservation Tillage	Barley	63%	ADEQ 2001	Windblown Emissions - Assumed 20% ground cover.
Harvest	Conservation Tillage	Corn	63%	ADEQ 2001	
Harvest	Conservation Tillage	Cotton	63%	ADEQ 2001	
Harvest	Conservation Tillage	Wheat	63%	ADEQ 2001	
Harvest	Equipment Modification	Alfalfa	50%	ADEQ 2010	
Harvest	Equipment Modification	Barley	50%	ADEQ 2010	
Harvest	Equipment Modification	Corn	50%	ADEQ 2010	
Harvest	Equipment Modification	Cotton	50%	ADEQ 2010	
Harvest	Equipment Modification	Wheat	50%	ADEQ 2010	
Harvest	Green Chop	Alfalfa	10%	San Joaquin	Activity Emissions
Harvest	Green Chop	Barley	20%	San Joaquin	
Harvest	Green Chop	Corn	17%	San Joaquin	
Harvest	Green Chop	Wheat	20%	San Joaquin	
Harvest	Green Chop	Alfalfa	10%	Assumed	Windblown Emissions
Harvest	Green Chop	Barley	10%	Assumed	
Harvest	Green Chop	Corn	10%	Assumed	
Harvest	Green Chop	Wheat	10%	Assumed	
Harvest	Integrated Pest Management	Alfalfa	8%	San Joaquin	Activity Emissions
Harvest	Integrated Pest Management	Barley	14%	San Joaquin	
Harvest	Integrated Pest Management	Corn	12%	San Joaquin	
Harvest	Integrated Pest Management	Cotton	9%	San Joaquin	
Harvest	Integrated Pest Management	Wheat	14%	San Joaquin	
Harvest	Integrated Pest Management	Alfalfa	10%	Assumed	Windblown Emissions
Harvest	Integrated Pest Management	Barley	10%	Assumed	
Harvest	Integrated Pest Management	Corn	10%	Assumed	
Harvest	Integrated Pest Management	Cotton	10%	Assumed	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Harvest	Integrated Pest Management	Wheat	10%	Assumed	Windblown Emissions
Harvest	Limited Harvest Activity	Alfalfa	100%	Assumed	Activity Emissions - This requirement prevents ANY harvest the day before and day of a high risk event.
Harvest	Limited Harvest Activity	Barley	100%	Assumed	
Harvest	Limited Harvest Activity	Corn	100%	Assumed	
Harvest	Limited Harvest Activity	Cotton	100%	Assumed	
Harvest	Limited Harvest Activity	Vegetables	100%	Assumed	
Harvest	Limited Harvest Activity	Wheat	100%	Assumed	
Harvest	Limited Harvest Activity	Alfalfa	10%	Assumed	Windblown Emissions
Harvest	Limited Harvest Activity	Barley	10%	Assumed	
Harvest	Limited Harvest Activity	Corn	10%	Assumed	
Harvest	Limited Harvest Activity	Cotton	10%	Assumed	
Harvest	Limited Harvest Activity	Vegetables	10%	Assumed	
Harvest	Limited Harvest Activity	Wheat	10%	Assumed	
Harvest	Precision Farming	Alfalfa	15%	San Joaquin	
Harvest	Precision Farming	Barley	15%	San Joaquin	
Harvest	Precision Farming	Corn	15%	San Joaquin	
Harvest	Precision Farming	Cotton	15%	San Joaquin	
Harvest	Precision Farming	Wheat	15%	San Joaquin	
Harvest	Reduced Harvest Activity	Barley	50%	ADEQ 2001	Used midpoint of CE's reported
Harvest	Reduced Harvest Activity	Corn	50%	ADEQ 2001	
Harvest	Reduced Harvest Activity	Cotton	50%	ADEQ 2001	
Harvest	Reduced Harvest Activity	Wheat	2%	ADEQ 2001	
Harvest	Reduced Tillage System	Alfalfa	63%	Walters & Jasa / ADEQ 2001	Windblown Emissions - Assumed RTS was equivalent to residue management with 20% ground cover.
Harvest	Reduced Tillage System	Barley	63%	Walters & Jasa / ADEQ 2001	
Harvest	Reduced Tillage System	Cotton	63%	Walters & Jasa / ADEQ 2001	
Harvest	Reduced Tillage System	Vegetables	63%	Walters & Jasa / ADEQ 2001	
Harvest	Reduced Tillage System	Wheat	63%	Walters & Jasa / ADEQ 2001	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Harvest	Shuttle System / Large Carrier	Alfalfa	17%	San Joaquin	
Harvest	Shuttle System / Large Carrier	Barley	20%	San Joaquin	
Harvest	Shuttle System / Large Carrier	Corn	17%	San Joaquin	
Harvest	Shuttle System / Large Carrier	Cotton	40%	San Joaquin	
Harvest	Shuttle System / Large Carrier	Wheat	20%	San Joaquin	
Harvest	Transgenic Crops	Alfalfa	8%	San Joaquin	
Harvest	Transgenic Crops	Corn	12%	San Joaquin	
Harvest	Transgenic Crops	Cotton	9%	San Joaquin	
Tilling	Cessation of Night Tilling	Alfalfa	0%		ADEQ assumed 0% CE, as these emissions will only be displaced to a subsequent day or hour of the day. Design days already assume no night tilling.
Tilling	Cessation of Night Tilling	Barley	0%		
Tilling	Cessation of Night Tilling	Corn	0%		
Tilling	Cessation of Night Tilling	Cotton	0%		
Tilling	Cessation of Night Tilling	Vegetables	0%		
Tilling	Cessation of Night Tilling	Wheat	0%		
Tilling	Combining Tractor Operations	Alfalfa	43%	ADEQ 2001	
Tilling	Combining Tractor Operations	Barley	43%	ADEQ 2001	
Tilling	Combining Tractor Operations	Corn	43%	ADEQ 2001	
Tilling	Combining Tractor Operations	Cotton	43%	ADEQ 2001	
Tilling	Combining Tractor Operations	Wheat	43%	ADEQ 2001	
Tilling	Conservation Tillage	Barley	19%	San Joaquin	Activity Emissions
Tilling	Conservation Tillage	Cotton	28%	San Joaquin	
Tilling	Conservation Tillage	Wheat	19%	San Joaquin	
Tilling	Conservation Tillage	Barley	63%	ADEQ 2001	Windblown Emissions - Assumed 20% ground cover.
Tilling	Conservation Tillage	Cotton	63%	ADEQ 2001	
Tilling	Conservation Tillage	Wheat	63%	ADEQ 2001	
Tilling	Equipment Modification	Alfalfa	35%	San Joaquin	
Tilling	Equipment Modification	Barley	50%	ADEQ 2010	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Tilling	Equipment Modification	Corn	50%	ADEQ 2010	
Tilling	Equipment Modification	Cotton	50%	ADEQ 2010	
Tilling	Equipment Modification	Wheat	50%	ADEQ 2010	
Tilling	Limited Activity during High Risk	Alfalfa	100%	Calculated	Activity Emissions - This requirement prevents ANY tillage the day before and day of a high risk event.
Tilling	Limited Activity during High Risk	Barley	100%	Calculated	
Tilling	Limited Activity during High Risk	Corn	100%	Calculated	
Tilling	Limited Activity during High Risk	Cotton	100%	Calculated	
Tilling	Limited Activity during High Risk	Wheat	100%	Calculated	
Tilling	Limited Activity during High Risk	Alfalfa	10%	Assumed	Windblown - This control will prevent some farmers from destabilizing the land on a high risk day, but due to uncertainties regarding the ground's previous level of stability, ADEQ assumes a conservative 10%.
Tilling	Limited Activity during High Risk	Barley	10%	Assumed	
Tilling	Limited Activity during High Risk	Corn	10%	Assumed	
Tilling	Limited Activity during High Risk	Cotton	10%	Assumed	
Tilling	Limited Activity during High Risk	Wheat	10%	Assumed	
Tilling	Planting based on Soil Moisture	Alfalfa	30%	ADEQ 2001	Activity Emissions
Tilling	Planting based on Soil Moisture	Barley	30%	ADEQ 2001	Activity Emissions
Tilling	Planting based on Soil Moisture	Corn	30%	ADEQ 2001	Activity Emissions
Tilling	Planting based on Soil Moisture	Cotton	30%	ADEQ 2001	Activity Emissions
Tilling	Planting based on Soil Moisture	Wheat	30%	ADEQ 2001	Activity Emissions
Tilling	Planting based on Soil Moisture	Alfalfa	81%	Calculated	Windblown Emissions - Assumed fully stabilized since soil is wet to 60% of field capacity (modeled as average reduction between base EF and stabilized EF). Based on STF monitor design day taking a plot from fully disturbed to fully stabilized.
Tilling	Planting based on Soil Moisture	Barley	81%	Calculated	
Tilling	Planting based on Soil Moisture	Corn	81%	Calculated	
Tilling	Planting based on Soil Moisture	Cotton	81%	Calculated	
Tilling	Planting based on Soil Moisture	Wheat	81%	Calculated	
Tilling	Precision Farming	Alfalfa	15%	San Joaquin	
Tilling	Precision Farming	Barley	15%	San Joaquin	
Tilling	Precision Farming	Corn	15%	San Joaquin	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Tilling	Precision Farming	Cotton	15%	San Joaquin	
Tilling	Precision Farming	Vegetables	15%	San Joaquin	
Tilling	Precision Farming	Wheat	15%	San Joaquin	
Tilling	Reduced Tillage System	Alfalfa	25%	San Joaquin	Activity Emissions - Assumed RTS was equivalent to Conservation Tillage reported in San Joaquin.
Tilling	Reduced Tillage System	Barley	19%	San Joaquin	
Tilling	Reduced Tillage System	Cotton	28%	San Joaquin	
Tilling	Reduced Tillage System	Vegetables	25%	San Joaquin	
Tilling	Reduced Tillage System	Wheat	19%	San Joaquin	
Tilling	Reduced Tillage System	Alfalfa	63%	Walters & Jasa / ADEQ 2001	Windblown Emissions - Assumed RTS was equivalent to residue management with 20% ground cover.
Tilling	Reduced Tillage System	Barley	63%	Walters & Jasa / ADEQ 2001	
Tilling	Reduced Tillage System	Cotton	63%	Walters & Jasa / ADEQ 2001	
Tilling	Reduced Tillage System	Vegetables	63%	Walters & Jasa / ADEQ 2001	
Tilling	Reduced Tillage System	Wheat	63%	Walters & Jasa / ADEQ 2001	
Tilling	Tillage Based on Soil Moisture	Alfalfa	15%	ADEQ 2010	Activity Emissions - San Joaquin CE reported in ADEQ 2010
Tilling	Tillage Based on Soil Moisture	Cotton	15%	ADEQ 2010	
Tilling	Tillage Based on Soil Moisture	Vegetables	15%	ADEQ 2010	
Tilling	Tillage Based on Soil Moisture	Wheat	15%	ADEQ 2010	
Tilling	Tillage Based on Soil Moisture	Alfalfa	81%	Calculated	Windblown Emissions - Assumed fully stabilized since soil is wet to 40-60% of field capacity (modeled as average reduction between base EF and stabilized EF). Based on STF monitor design day taking a plot from fully disturbed to fully stabilized.
Tilling	Tillage Based on Soil Moisture	Cotton	81%	Calculated	
Tilling	Tillage Based on Soil Moisture	Vegetables	81%	Calculated	
Tilling	Tillage Based on Soil Moisture	Wheat	81%	Calculated	
Tilling	Timing of a Tillage Operation	Alfalfa	60%	ADEQ 2001	
Tilling	Timing of a Tillage Operation	Barley	60%	ADEQ 2001	
Tilling	Timing of a Tillage Operation	Corn	60%	ADEQ 2001	
Tilling	Timing of a Tillage Operation	Cotton	50%	ADEQ 2001	

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Tilling	Timing of a Tillage Operation	Wheat	60%	ADEQ 2001	
Tilling	Transgenic Crops	Alfalfa	8%	San Joaquin	
Tilling	Transgenic Crops	Corn	12%	San Joaquin	
Tilling	Transgenic Crops	Cotton	9%	San Joaquin	
Tilling	Transplanting	Vegetables	6%	San Joaquin	
Unpaved Roads	Access Restriction	N/A	2%	ADEQ 2001	Activity Emissions
Unpaved Roads	Access Restriction	N/A	0%		Windblown Emissions, assumed same stabilization as more frequently traveled roads.
Unpaved Roads	Aggregate Cover	N/A	46%	San Joaquin	Activity Emissions
Unpaved Roads	Aggregate Cover	N/A	45%	Li 2001	Windblown Emissions - ADEQ assumed the average CE from Li 2001 was reduced by 50% due to travel on the aggregate.
Unpaved Roads	Reduce Vehicle Speed	N/A	26%	Calculated	Activity Emissions - Calculated using the AP-42 equation
Unpaved Roads	Reduce Vehicle Speed	N/A	0%		Windblown emissions
Unpaved Roads	Synthetic Particulate Suppressant	N/A	73%	ADEQ 2010	Activity Emissions
Unpaved Roads	Synthetic Particulate Suppressant	N/A	65%	Calculated	Windblown Emissions - Assumed conversion to fully stabilized soil (modeled as average reduction between base EF and stabilized EF) resulting in a CE of 81%. Conservatively, ADEQ then assumed this CE to only by 80% effective due to repeated disturbance due to traffic resulting in a 65% CE.

Table DI2-1. Crop Control Efficiencies

Category	Practice	Crop	Control Efficiency	Reference	Comments
Unpaved Roads	Watering	N/A	67%	Calculated	Activity Emissions - Assumed the same control efficiency as for the new construction rule, which assumes regular watering to maintain soil moisture >6%.
Unpaved Roads	Watering	N/A	65%	Calculated	Windblown Emissions - Assumed conversion to fully stabilized soil (modeled as average reduction between base EF and stabilized EF) resulting in a CE of 81%. Conservatively, ADEQ then assumed this CE to only by 80% effective due to repeated disturbance due to traffic resulting in a 65% CE.
Unpaved Roads	Wind Barrier	Alfalfa	54%	Grantz 1998	Windblown Emissions - Minimum reported control efficiency from Grantz 1998 for wind barriers of 55% porosity

DI2.1 References

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DI3 Crop Season Distribution

The following table shows the calculated relative length of each crop season (*i.e.*, tillage, harvest, cropland, and growing), as determined as a percent of the entire year. This information was used in the calculation of annual control effectivenesses for windblown dust from crop fields. The distributions were calculated based on the Pinal County crop calendar (Appendix B, Exhibit BIII).

Table DI3-1. Crop Season Length (% of the year)

Crop	Tillage	Harvest	Cropland	Growing
Alfalfa	0.0%	80.6%	0.0%	19.4%
Cotton	19.4%	38.9%	11.1%	30.6%
Forage	0.0%	80.6%	0.0%	19.4%
Vegetables	19.4%	44.4%	36.1%	0.0%
Corn	22.2%	28.4%	25.0%	24.4%
Grain	25.0%	28.5%	33.3%	13.2%

DI4 Dairy Operation Survey

Date: _____ Page Number: ____

Agricultural Best Management Practices (AgBMP) Survey– Pinal County

Total Number of Animals:_____

Total Miles of Unpaved Roads:_____

Total Acreage of Unpaved Access Connections/Equipment Areas: _____

Best Management Practices: Please indicate Best Management Practices implemented for the Commercial Dairy Operation (Use multiple forms if necessary).

Arenas, Corrals, and Pens:

- ☐ Use Free Stall Housing
- ☐ Provide Shade in Corral
- ☐ Provide Cooling in Corral
- ☐ Cement Cattle Walkways to Milk Barn
- ☐ Groom Manure Surface
- ☐ Water Misting Systems
- ☐ Use Drag Equipment to Maintain Pens
- ☐ Pile Manure between Cleanings
- ☐ Feed Green Chop
- ☐ Keep Calves in Barns or Hutches
- ☐ Do Not Run Cattle
- ☐ Apply A Fibrous Layer, or
- ☐ Wind Barrier

Notes:

Animal Waste Handling and Transporting:

- ☐ Feed Higher Moisture Feed to Dairy Cattle
- ☐ Store and Maintain Feed Stock
- ☐ Covers for Silage
- ☐ Store Silage in Bunkers
- ☐ Increase Manure Moisture
- ☐ Cover Manure Hauling Trucks, or
- ☐ Do Not Load Manure Trucks with Dry Manure When Wind Exceeds 15 mph

Notes:

Unpaved Access Connections:

- ☐ Install Signage to Limit Vehicle Speed to 15 mph
- ☐ Install Speed Control Devices
- ☐ Restrict Access to Through Traffic
- ☐ Install and Maintain a Track-Out Control Device
- ☐ Apply and Maintain Pavement in High Traffic Areas
- ☐ Apply and Maintain Aggregate Cover
- ☐ Apply and Maintain Synthetic Particulate Suppressant, or
- ☐ Apply and Maintain Water as a Dust Suppressant

Notes:

Unpaved Roads or Feed Lanes

- ☐ Install Engine Speed Governors on Feed Truck to 15 mph
- ☐ Install Signage to Limit Vehicle Speed to 15 mph
- ☐ Install Speed Control Devices
- ☐ Restrict Access to Through Traffic
- ☐ Apply and Maintain Pavement in High Traffic Areas
- ☐ Apply and Maintain Aggregate Cover
- ☐ Apply and Maintain Synthetic Particulate Suppressant
- ☐ Apply and Maintain Water as a Dust Suppressant
- ☐ Use Appropriate Vehicles Such as Electric Carts or Small Utility Vehicles Instead of Trucks, or
- ☐ Apply and Maintain Pavement or Cement Feed Lanes

Notes:

DI5 Dairy Operation Control Efficiencies

Table DI5-1 presents the control efficiencies used to calculate dairy control effectivenesses. Unless otherwise specified, activity and windblown control efficiencies are assumed equivalent.

Table DI5-1. Dairy Operation Control Efficiencies

Operation / Sector	BMP	Control Efficiency	Reference	Comments
Arenas, Corrals, Pens	Apply a Fibrous Layer	10%	Ag BMP Committee	Activity
	Cement Dairy Cattle Walkways to Milk Barn	25%		Activity
	Do Not Run Cattle	10%		Activity
	Feed Green Chop	10%		
	Free Stall Housing	60%		
	Groom Manure Surface	10%		
	Keep Calves in Barns or Hutches	10%		Activity
	Pile Manure Between Cleanings	10%		
	Provide Shade in Corral	10%		Activity
	Provide Cooling in Corral	10%		Activity
	Use Drag Equipment to Maintain Pens	10%		Activity
	Water Misting Systems	10%		
	Wind Barrier	10%		Activity
	Apply a Fibrous Layer	33%	San Joaquin	Windblown. Control efficiency assumed equivalent to Chips/Mulch CE in Table DI2-1.
	Cement Dairy Cattle Walkways to Milk Barn	10%	Ag BMP Committee	Windblown
	Do Not Run Cattle	0%	Assumed	Windblown, assumed to not affect windblown dust emissions.
	Keep Calves in Barns or Hutches	0%	Assumed	
	Provide Shade in Corral	0%	Assumed	
	Provide Cooling in Corral	0%	Assumed	
	Use Drag Equipment to Maintain Pens	0%	Assumed	
	Wind Barrier	45%	ADEQ 2010	Windblown. Control efficiency assumed equivalent to Wind Barrier CE in Table DI2-1.

Table DI5-1. Dairy Operation Control Efficiencies

Operation / Sector	BMP	Control Efficiency	Reference	Comments
Animal Waste (and Feed) Handling & Transport	Cover Manure Hauling Trucks	10%	Ag BMP Committee	
	Covers for Silage	10%		
	Feed High Moisture Feed	10%		
	Increase Manure Moisture	10%		
	Do Not Load Dry Manure when Wind > 15mph	10%		
	Store & Maintain Feed Stock	10%		
	Store Silage in Bunkers	10%		
Unpaved Access Connections	Apply & Maintain Pavement in High Traffic Areas	8%	Ag BMP Committee	
	Apply & Maintain Aggregate Cover	46%	San Joaquin	Activity. Control efficiency assumed equivalent to that reported in Table DI2-1.
	Apply & Maintain Synthetic Particulate Suppressants	73%	ADEQ 2010	
	Apply & Maintain Water as a Dust Suppressant	67%	Calculated	
	Install Signage to Limit Vehicle Speed to 15mph	23%	Calculated	This BMP was calculated by Sierra Research utilizing EPA's AP-42 equation for unpaved roads.
	Install Speed Control Devices	23%	Calculated	
	Install & Maintain a Trackout Control Device			This BMP was not reported by any respondents as a preferred control; therefore, no control efficiency was researched.
	Restrict Access to Through Traffic	2%	ADEQ 2001	Control efficiency assumed equivalent to that in reported Table DI2-1.
	Apply & Maintain Aggregate Cover	45%	Li 2001	Windblown. Control efficiency assumed equivalent to that reported in Table DI2-1.
	Apply & Maintain Synthetic Particulate Suppressants	65%	Calculated	
	Apply & Maintain Water as a Dust Suppressant	65%	Calculated	

Table DI5-1. Dairy Operation Control Efficiencies

Operation / Sector	BMP	Control Efficiency	Reference	Comments
Unpaved Roads or Feed Lanes	Apply & Maintain Aggregate Cover	46%	San Joaquin	Activity. Control efficiency assumed equivalent to that reported in Table DI2-1.
	Apply & Maintain Oil on Roads with Approved Products	76%	Ag BMP Committee	
	Apply & Maintain Pavement in High Traffic Areas	8%	Calculated	Calculated based on input from the Agricultural BMP committee on the average mileage of roadways with >20 ADT as compared to that of total mileage and assuming a paving control efficiency of 99%.
	Apply & Maintain Synthetic Particulate Suppressants	73%	ADEQ 2010	Activity. Control efficiency assumed equivalent to that reported in Table DI2-1.
	Apply & Maintain Water as a Dust Suppressant	67%	Calculated	
	Install Engine Speed Governors on Feed Truck to 15mph	23%	Calculated	This BMP was calculated by Sierra Research utilizing EPA's AP-42 equation for unpaved roads.
	Install Speed Control Devices	23%	Calculated	
	Install Signage to Limit Vehicle Speed to 15mph	23%	Calculated	
	Restrict Access to Through Traffic	2%	ADEQ 2001	Control efficiency assumed equivalent to that reported in Table DI2-1.
	Use Appropriate Vehicles	20%	Ag BMP Committee	
	Apply & Maintain Aggregate Cover	45%	Li 2001	Windblown. Control efficiency assumed equivalent to that reported in Table DI2-1.
	Apply & Maintain Synthetic Particulate Suppressants	65%	Calculated	
	Apply & Maintain Water as a Dust Suppressant	65%	Calculated	

DI5.1 References

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Exhibit DII MAG Methodology for MOVES2014

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DII1 Pinal County PM-10 Emissions for Five Episode Days

For the five episode days, vehicle exhaust, tire wear, and brake wear emissions were calculated for the four modeling domains (City of Maricopa, Cowtown, Stanfield, and Pinal County Housing Complex) using the latest onroad model approved by EPA, MOVES2014. The MOVES2014 simulations were configured to operate in both inventory and rate modes for all five episode days.

The four modeling domains are located within Area C where I/M programs are not required.

In September 2014, MAG transportation division generated a reference year 2015 detailed traffic assignment without centroid (called "2015_MAG_no_Centroid") for four non-centroid areas, each representing the TAZ zones surrounding the four monitoring sites. The detailed traffic assignment data for each area are scaled individually for the year 2008 and 2018. The scaled traffic assignment data for the four areas are used to calculate link-based mobile emissions.

Information or input data for the MOVES2014 simulation is described below.

DII1.1 Year 2008

Scaling factors for the traffic assignment data without centroid

For each non-centroid area, the first ratio was calculated between the total VMTs in the 2012 MAG traffic assignment (with centroids) and the 2015 MAG traffic assignment (with centroids). The second ratio was MAG's estimated human population between the years 2008 and 2012. Note that an average population ratio was used for the Cowtown area, because human population was zero in 2008 in that area. The multiplication of the two ratios became the back-casted ratio between 2008 and 2015 for the same non-centroid area. The four ratios were applied individually to each area of the "2015_MAG_no_Centroid" traffic assignment to generate the "2008_MAG_no_Centroid".

Average Speed Distribution

Using the "2008_MAG_no_Centroid" traffic assignment, speed distributions by vehicle types, road types, and hours for weekdays were estimated for the union of the four areas. For weekend days, nighttime's speed distribution, which is a 12-hour span, is applied for another 12-hour span.

Annual VMT

The 2008 annual VMT by HPMS vehicle type was developed using the scaled "2008_MAG_no_Centroid" traffic assignment.

VMT Fractions

Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data recorded by continuous traffic counters on freeways (ADOT Freeway Management System) and arterials (Phoenix Automatic Traffic Recorders) during the year 2007.

Road Type Distribution

The VMT by vehicle, area, and facility types from the scaled "2008_MAG_no_Centroid" traffic assignment was translated into road VMT fractions for each vehicle source type using a mapping table derived by MOVES2014 default VMT fraction for 2008.

Source Type Population

Based on ADOT's 2008 vehicle registration information for Pinal County broken down by source type, source type populations for the union of the four non-centroid areas were scaled using ratios derived by population data covered by each non-centroid area and Pinal County in 2008. The 2008 population data for Pinal County and the four non-centroid area were provided by the MAG GIS group. Note that no single unit or combination long-haul trucks were included, because they are assumed to operate on interstate highways.

Source Type Age Distribution

As used by Sierra Research, the same source type age distributions provided by ADOT were applied. These source type age distributions were derived from the 2008 vehicle registration data for Pinal County.

Meteorology

The 24-hour temperature and relative humidity data for each of the five episode days were imported from Casa Grande in 2008.

Fuel Data

Based on MOVES2014 default values for 2008, gasoline and diesel fuel formulations were updated with the 2008 fuel inspection data provided by the Arizona Department of Weights and Measures.

I/M Programs

No I/M programs were applied for the union of the four non-centroid areas.

Alternate Vehicle Fuel Technology (AVFT)

Based on MOVES2014 default values, transit bus data were updated with the local year 2010 information provided by the Valley Metro.

Ramp Fractions

No ramp fractions calculations were applied, because there was no ramp road types within the modeling domains.

DII1.2 Year 2018

Scaling factors for the traffic assignment data without centroid

For each non-centroid area, total VMT for the year 2018 was calculated through interpolation between 2015 MAG traffic assignment (with centroids) and the 2025 MAG traffic assignment (with centroids). Then four ratios of the total VMT between 2018 and 2015 for each area were

used to project "2018_MAG_no_Centroid" traffic assignment based on the referenced "2015_MAG_no_Centroid".

Average Speed Distribution

Using the "2018_MAG_no_Centroid" traffic assignment, speed distributions by vehicle types, road types, and hours for weekdays were estimated. For weekend days, nighttime's speed distribution, which is a 12-hour span, is applied for another 12-hour span.

Annual VMT

The 2018 annual VMT by HPMS vehicle type was developed using the scaled "2018_MAG_no_Centroid" traffic assignment.

VMT Fractions

Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data collected in the Phoenix area in 2007.

Road Type Distribution

The VMT by vehicle, area, and facility types from the "2018_MAG_no_Centroid" traffic assignment was translated into road VMT fractions for each vehicle source type using a mapping table derived by MOVES2014 default VMT fraction for 2018.

Source Type Population

Based on ADOT's 2008 vehicle registration information for Pinal County broken down by source type, the 2018 source type population for Pinal County was scaled up from the 2008 source type population with MAG's population projections. The 2018 source type populations for the union of the four non-centroid area were scaled using ratios derived by population data covered by each non-centroid area and Pinal County in 2018. The 2018 population data were provided by the MAG GIS group. Note that no single unit or combination long-haul trucks were included, because they are assumed to operate on interstate highways.

Source Type Age Distribution

The 2008 source type age distributions were held constant for the 2018 projections.

Meteorology

The 2008 meteorology inputs were held constant for the 2018 projections.

Fuel Data

To reflect Tier 3 standards, MOVES2014 default fuel data for Pinal County in 2018 were used.

I/M Programs

No I/M programs were applied for the union of the four non-centroid area.

Alternate Vehicle Fuel Technology (AVFT)

Based on MOVES2014 default values, transit bus data were updated with the local year 2010 information provided by the Valley Metro.

Ramp Fractions

No ramp fractions calculations were applied, because there was no ramp road types within the modeling domains.

DII2 Pinal County PM-10 Annual Emissions

The annual total vehicle exhaust, tire, and brake wear emissions were calculated using the latest onroad model approved by EPA, MOVES2014. The MOVES2014 simulations were configured to operate in inventory mode for all 12 months and weekend/weekdays with the output option of annual aggregation.

The Pinal County PM-10 nonattainment area (NAA) needs to be divided into two areas in terms of implementation of I/M programs. One is Area A in which I/M programs are mandatory and the other is non-Area A in which I/M programs are not required. Therefore, MOVES2014 simulations were conducted for both Area A and non-Area A within the Pinal County PM-10 NAA.

Information on input data for the MOVES2014 simulation is described below.

DII2.1 Year 2008

Average Speed Distribution

Using the 2012 MAG traffic assignment, speed distributions by vehicle types, road types, and hours for weekdays were estimated for each of Area A and non-Area A within the Pinal County PM-10 NAA. For weekend days, nighttime's speed distribution, which is a 12-hour span, is applied for another 12-hour span. Speed distribution from the 2012 MAG traffic assignment was used in the 2008 emission calculations.

Annual VMT

The 2012 annual VMTs by HPMS vehicle type were developed for Area A and non-Area A within the Pinal County PM-10 NAA using the 2012 MAG traffic assignment. For non-Area A, additional adjustment factors for road type and vehicle type were applied to reflect the local road traffic volumes on behalf of the centroid connector traffic volumes. The adjustment factors were derived from the MAG 2015 traffic assignment. Based on the 2012 annual VMT by HPMS vehicle type, the 2008 annual VMTs for Area A and non-Area A were back-casted using population estimates between 2008 and 2012 within each geographic area.

VMT Fractions

Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data recorded by continuous traffic counters on freeways (ADOT Freeway Management System) and arterials (Phoenix Automatic Traffic Recorders) during the year 2007.

Road Type Distribution

The VMT by vehicle, area, and facility types from the 2012 MAG traffic assignment was translated into road VMT fractions for each vehicle source type using a mapping table derived by MOVES2014 default VMT fraction for 2008. The road type distribution was developed for Area A and non-Area A separately.

Source Type Population

Based on ADOT's 2008 vehicle registration information for Pinal County broken down by source type, source type populations for Area A and non-Area A within the Pinal County PM-10 NAA were scaled using ratios derived by population data covered by the PM-10 NAA and Pinal County in 2008. The 2008 population data for Pinal County and geographic coverages were provided by the MAG GIS group.

Source Type Age Distribution

As used by Sierra Research, the same source type age distributions provided by ADOT were applied. These source type age distributions were derived from the 2008 vehicle registration data for Pinal County. It is assumed that the Pinal County PM-10 NAA has the same source type age distribution regardless of Area A or non-Area A.

Meteorology

The meteorological conditions were imported as monthly average temperature and relative humidity data for each hour from Casa Grande in 2008.

Fuel Data

Based on MOVES2014 default values for 2008, gasoline and diesel fuel formulations were updated with the 2008 fuel inspection data provided by the Arizona Department of Weights and Measures. It is assumed that the Pinal County PM-10 NAA has the same fuel data for Area A and non-Area A.

I/M Programs

The I/M programs developed for the Maricopa County conformity analysis were applied for Area A within the Pinal County PM-10 NAA, while no I/M programs were applied for non- Area A within the Pinal County PM-10 NAA.

Alternative Vehicle Fuels and Technologies (AVFT)

Based on MOVES2014 default values, transit bus data were updated with the local 2011 information provided by the Valley Metro.

Ramp Fractions

Using the 2012 MAG traffic assignment, ramp fractions were estimated for Area A and non-Area A separately. It is assumed that the same ramp fractions are maintained between the years 2008 and 2012.

DII2.2 Year 2018

Average Speed Distribution

Using the 2015 MAG traffic assignment, speed distributions by vehicle types, road types, and hours for weekdays were estimated for each of Area A and non-Area A within the Pinal County PM-10 NAA. For weekend days, nighttime's speed distribution, which is a 12-hour span, is applied for another 12-hour span. Speed distribution from the 2015 MAG traffic assignment was used in the 2018 emission calculations.

Annual VMT

The 2015 and 2025 annual VMTs by HPMS vehicle type were developed for Area A and non-Area A within the Pinal County PM-10 NAA using the 2015 and 2025 MAG traffic assignment, respectively. For non-Area A, additional adjustment factors for road type and vehicle type were applied to reflect the local road traffic volumes on behalf of the centroid connector traffic volumes. The adjustment factors were derived from the MAG 2015 traffic assignment. The 2018 VMTs for Area A and non-Area A were interpolated using the 2015 and 2025 annual VMTs within each geographic area.

VMT Fractions

Monthly, daily, and hourly VMT fractions were derived from the traffic volume adjustment factors for freeways and arterials based on data collected in the Phoenix area in 2007.

Road Type Distribution

The VMT by vehicle, area, and facility types from the 2015 MAG traffic assignment was translated into road VMT fractions for each vehicle source type using a mapping table derived by MOVES2014 default VMT fraction for 2018. The road type distribution was developed for Area A and non-Area A separately.

Source Type Population

Based on ADOT's 2008 vehicle registration information for Pinal County broken down by source type, the 2018 source type population for Pinal County was scaled up from the 2008 source type population with MAG's population projections. The 2018 source type populations for Area A and non-Area A were scaled using ratios derived by population data covered by the PM-10 NAA and Pinal County in 2018. The 2018 population data were provided by the MAG GIS group.

Source Type Age Distribution

The 2008 source type age distributions were held constant for the 2018 projections.

Meteorology

The meteorological conditions were imported as monthly average temperature and relative humidity data for each hour from Casa Grande in 2008. The 2008 meteorology inputs were held constant for the 2018 projections.

Fuel Data

The 2018 fuel data for Pinal County were obtained from the MOVES2014 default fuel data in order to address the Tier 3 vehicle and fuel standards, which will begin phasing in with the 2017 model year. It is assumed that the Pinal County PM-10 NAA has the same fuel data for Area A and non-Area A.

I/M Programs

The I/M programs developed for the Maricopa County conformity analysis were applied for Area A within the Pinal County PM-10 NAA, while no I/M programs were applied for non- Area A within the Pinal County PM-10 NAA.

Alternative Vehicle Fuels and Technologies (AVFT)

Based on MOVES2014 default values, transit bus data were updated with the local 2011 information provided by the Valley Metro.

Ramp Fractions

Using the 2015 MAG traffic assignment, ramp fractions were estimated for Area A and non-Area A separately. It is assumed that the same ramp fractions are maintained between the years 2015 and 2018.

Appendix E

Procedural Requirements and Authority

Exhibit E-I

Delegation of Authority

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

August 17, 2015

TO: Eric Massey
Division Director
Air Quality Division

Under A.R.S. §49-104(D)(2), I authorize you, Eric Massey, Division Director, Air Quality Division, Arizona Department of Environmental Quality, to perform any act, including execution of any pertinent documents, which I as Director of the Arizona Department of Environmental Quality am authorized or required to do by law with respect to A.R.S. Title 49, chapters 1 and 3 and any other acts relating to air quality including personnel actions.

This authority shall remain in effect until it is revoked or upon your separation from the Arizona Department of Environmental Quality. You may further delegate this authority in the best interest of the agency, however, those delegations must be in writing and you must forward a copy of any further delegations to me.

This delegation is effective August 17, 2015, and revokes all earlier delegations. I ratify all acts performed by you as Air Quality Division Director concerning the duties and functions in this delegation letter.

Misael Cabrera
Director

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Exhibit E-II

Authorizing Statutes

Authorizing Statute

A.R.S. § 49-104

A.R.S. § 49-104. *Powers and duties of the department and director*

A. The department shall:

1. Formulate policies, plans and programs to implement this title to protect the environment.
2. Stimulate and encourage all local, state, regional and federal governmental agencies and all private persons and enterprises that have similar and related objectives and purposes, cooperate with those agencies, persons and enterprises and correlate department plans, programs and operations with those of the agencies, persons and enterprises.
3. Conduct research on its own initiative or at the request of the governor, the legislature or state or local agencies pertaining to any department objectives.
4. Provide information and advice on request of any local, state or federal agencies and private persons and business enterprises on matters within the scope of the department.
5. Consult with and make recommendations to the governor and the legislature on all matters concerning department objectives.
6. Promote and coordinate the management of air resources to assure their protection, enhancement and balanced utilization consistent with the environmental policy of this state.
7. Promote and coordinate the protection and enhancement of the quality of water resources consistent with the environmental policy of this state.
8. Encourage industrial, commercial, residential and community development that maximizes environmental benefits and minimizes the effects of less desirable environmental conditions.
9. Assure the preservation and enhancement of natural beauty and man-made scenic qualities.
10. Provide for the prevention and abatement of all water and air pollution including that related to particulates, gases, dust, vapors, noise, radiation, odor, nutrients and heated liquids in accordance with article 3 of this chapter and chapters 2 and 3 of this title.
11. Promote and recommend methods for the recovery, recycling and reuse or, if recycling is not possible, the disposal of solid wastes consistent with sound health, scenic and environmental quality policies. Beginning in 2014, the department shall report annually on its revenues and expenditures relating to the solid and hazardous waste programs overseen or administered by the department.
12. Prevent pollution through the regulation of the storage, handling and transportation of solids, liquids and gases that may cause or contribute to pollution.
13. Promote the restoration and reclamation of degraded or despoiled areas and natural resources.
14. Assist the department of health services in recruiting and training state, local and district health department personnel.
15. Participate in the state civil defense program and develop the necessary organization and facilities to meet wartime or other disasters.
16. Cooperate with the Arizona-Mexico commission in the governor's office and with researchers at universities in this state to collect data and conduct projects in the United States and Mexico on issues that are within the scope of the department's duties and that relate to quality of life, trade and economic development in this state in a manner that will help the Arizona-Mexico commission to assess and enhance the economic competitiveness of this state and of the Arizona-Mexico region.

17. Unless specifically authorized by the legislature, ensure that state laws, rules, standards, permits, variances and orders are adopted and construed to be consistent with and no more stringent than the corresponding federal law that addresses the same subject matter. This provision shall not be construed to adversely affect standards adopted by an Indian tribe under federal law.

B. The department, through the director, shall:

1. Contract for the services of outside advisers, consultants and aides reasonably necessary or desirable to enable the department to adequately perform its duties.
2. Contract and incur obligations reasonably necessary or desirable within the general scope of department activities and operations to enable the department to adequately perform its duties.
3. Utilize any medium of communication, publication and exhibition when disseminating information, advertising and publicity in any field of its purposes, objectives or duties.
4. Adopt procedural rules that are necessary to implement the authority granted under this title, but that are not inconsistent with other provisions of this title.
5. Contract with other agencies, including laboratories, in furthering any department program.
6. Use monies, facilities or services to provide matching contributions under federal or other programs that further the objectives and programs of the department.
7. Accept gifts, grants, matching monies or direct payments from public or private agencies or private persons and enterprises for department services and publications and to conduct programs that are consistent with the general purposes and objectives of this chapter. Monies received pursuant to this paragraph shall be deposited in the department fund corresponding to the service, publication or program provided.
8. Provide for the examination of any premises if the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed on the premises. The director shall give the owner or operator the opportunity for its representative to accompany the director on an examination of those premises. Within forty-five days after the date of the examination, the department shall provide to the owner or operator a copy of any report produced as a result of any examination of the premises.
9. Supervise sanitary engineering facilities and projects in this state, authority for which is vested in the department, and own or lease land on which sanitary engineering facilities are located, and operate the facilities, if the director determines that owning, leasing or operating is necessary for the public health, safety or welfare.
10. Adopt and enforce rules relating to approving design documents for constructing, improving and operating sanitary engineering and other facilities for disposing of solid, liquid or gaseous deleterious matter.
11. Define and prescribe reasonably necessary rules regarding the water supply, sewage disposal and garbage collection and disposal for subdivisions. The rules shall:

(a) Provide for minimum sanitary facilities to be installed in the subdivision and may require that water systems plan for future needs and be of adequate size and capacity to deliver specified minimum quantities of drinking water and to treat all sewage.
(b) Provide that the design documents showing or describing the water supply, sewage disposal and garbage collection facilities be submitted with a fee to the department for review and that no lots in any subdivision be offered for sale before compliance with the

standards and rules has been demonstrated by approval of the design documents by the department.

12. Prescribe reasonably necessary measures to prevent pollution of water used in public or semipublic swimming pools and bathing places and to prevent deleterious conditions at such places. The rules shall prescribe minimum standards for the design of and for sanitary conditions at any public or semipublic swimming pool or bathing place and provide for abatement as public nuisances of premises and facilities that do not comply with the minimum standards. The rules shall be developed in cooperation with the director of the department of health services and shall be consistent with the rules adopted by the director of the department of health services pursuant to section 36-136, subsection H, paragraph 10.

13. Prescribe reasonable rules regarding sewage collection, treatment, disposal and reclamation systems to prevent the transmission of sewage borne or insect borne diseases. The rules shall:

(a) Prescribe minimum standards for the design of sewage collection systems and treatment, disposal and reclamation systems and for operating the systems.

(b) Provide for inspecting the premises, systems and installations and for abating as a public nuisance any collection system, process, treatment plant, disposal system or reclamation system that does not comply with the minimum standards.

(c) Require that design documents for all sewage collection systems, sewage collection system extensions, treatment plants, processes, devices, equipment, disposal systems, on-site wastewater treatment facilities and reclamation systems be submitted with a fee for review to the department and may require that the design documents anticipate and provide for future sewage treatment needs.

(d) Require that construction, reconstruction, installation or initiation of any sewage collection system, sewage collection system extension, treatment plant, process, device, equipment, disposal system, on-site wastewater treatment facility or reclamation system conform with applicable requirements.

14. Prescribe reasonably necessary rules regarding excreta storage, handling, treatment, transportation and disposal. The rules shall:

(a) Prescribe minimum standards for human excreta storage, handling, treatment, transportation and disposal and shall provide for inspection of premises, processes and vehicles and for abating as public nuisances any premises, processes or vehicles that do not comply with the minimum standards.

(b) Provide that vehicles transporting human excreta from privies, septic tanks, cesspools and other treatment processes shall be licensed by the department subject to compliance with the rules. The department may require payment of a fee as a condition of licensure. After July 20, 2011, the department shall establish by rule a fee as a condition of licensure, including a maximum fee. As part of the rule making process, there must be public notice and comment and a review of the rule by the joint legislative budget committee. After September 30, 2013, the department shall not increase that fee by rule without specific statutory authority for the increase. The fees shall be deposited, pursuant to sections 35-146 and 35-147, in the solid waste fee fund established by section 49-881.

15. Perform the responsibilities of implementing and maintaining a data automation management system to support the reporting requirements of title III of the superfund amendments and reauthorization act of 1986 (P.L. 99-499) and article 2 of this chapter.

16. Approve remediation levels pursuant to article 4 of this chapter.
17. Establish or revise fees by rule pursuant to the authority granted under title 44, chapter 9, article 8 and chapters 4 and 5 of this title for the department to adequately perform its duties. All fees shall be fairly assessed and impose the least burden and cost to the parties subject to the fees. In establishing or revising fees, the department shall base the fees on:
(a) The direct and indirect costs of the department's relevant duties, including employee salaries and benefits, professional and outside services, equipment, in-state travel and other necessary operational expenses directly related to issuing licenses as defined in title 41, chapter 6 and enforcing the requirements of the applicable regulatory program.
(b) The availability of other funds for the duties performed.
(c) The impact of the fees on the parties subject to the fees.
(d) The fees charged for similar duties performed by the department, other agencies and the private sector.

C. The department may:
1. Charge fees to cover the costs of all permits and inspections it performs to ensure compliance with rules adopted under section 49-203, except that state agencies are exempt from paying the fees. Monies collected pursuant to this subsection shall be deposited, pursuant to sections 35-146 and 35-147, in the water quality fee fund established by section 49-210.
2. Contract with private consultants for the purposes of assisting the department in reviewing applications for licenses, permits or other authorizations to determine whether an applicant meets the criteria for issuance of the license, permit or other authorization. If the department contracts with a consultant under this paragraph, an applicant may request that the department expedite the application review by requesting that the department use the services of the consultant and by agreeing to pay the department the costs of the consultant's services. Notwithstanding any other law, monies paid by applicants for expedited reviews pursuant to this paragraph are appropriated to the department for use in paying consultants for services.

D. The director may:
1. If the director has reasonable cause to believe that a violation of any environmental law or rule exists or is being committed, inspect any person or property in transit through this state and any vehicle in which the person or property is being transported and detain or disinfect the person, property or vehicle as reasonably necessary to protect the environment if a violation exists.
2. Authorize in writing any qualified officer or employee in the department to perform any act that the director is authorized or required to do by law.

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Authorizing Statute

A.R.S. § 49-106

A.R.S. § 49-106. *Statewide application of rules*

The rules adopted by the department apply and shall be observed throughout this state, or as provided by their terms, and the appropriate local officer, council or board shall enforce them. This section does not limit the authority of local governing bodies to adopt ordinances and rules within their respective jurisdictions if those ordinances and rules do not conflict with state law and are equal to or more restrictive than the rules of the department, but this section does not grant local governing bodies any authority not otherwise provided by separate state law.

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Authorizing Statute

A.R.S. § 49-404

A.R.S. § 49-404. *State implementation plan*

A. The director shall 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.

B. The director may adopt rules that describe procedures for adoption of revisions to the state implementation plan.

C. The state implementation plan and all revisions adopted before September 30, 1992 remain in effect according to their terms, except to the extent otherwise provided by the clean air act, inconsistent with any provision of the clean air act, or revised by the administrator. No control requirement in effect, or required to be adopted by an order, settlement agreement or plan in effect, before the enactment of the clean air act in any area which is a nonattainment or maintenance area for any air pollutant may be modified after enactment in any manner unless the modification insures equivalent or greater emission reductions of the air pollutant. The director shall evaluate and adopt revisions to the plan in conformity with federal regulations and guidelines promulgated by the administrator for those purposes until the rules required by subsection B are effective.

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Authorizing Statute

A.R.S. § 49-406

A.R.S. § 49-406. *Nonattainment area plan*

A. For any ozone, carbon monoxide or particulate nonattainment or maintenance area the governor shall certify the metropolitan planning organization designated to conduct the continuing, cooperative and comprehensive transportation planning process for that area under 23 United States Code section 134 as the agency responsible for the development of a nonattainment or maintenance area plan for that area.

B. For any ozone, carbon monoxide or particulate nonattainment or maintenance area for which no metropolitan planning organization exists, the department shall be certified as the agency responsible for development of a nonattainment or maintenance area plan for that area.

C. For any ozone, carbon monoxide or particulate nonattainment or maintenance area, the department, the planning agency certified pursuant to subsection A of this section on behalf of elected officials of affected local government, the county air pollution control department or district, and the department of transportation shall, by November 15, 1992, and from time to time as necessary, jointly review and update planning procedures or develop new procedures.

D. In preparing the procedures described in subsection C of this section, the department, the planning agency certified pursuant to subsection A of this section on behalf of elected officials of affected local government, the county air pollution control department or district, and the department of transportation shall determine which elements of each revised implementation plan will be developed, adopted, and implemented, through means including enforcement, by the state and which by local governments or regional agencies, or any combination of local governments, regional agencies or the state.

E. The department, the planning agency certified pursuant to subsection A of this section on behalf of elected officials of affected local government, the county air pollution control department or district, and the department of transportation shall enter into a memorandum of agreement for the purpose of coordinating the implementation of the procedures described in subsection C and D of this section.

F. At a minimum, the memorandum of agreement shall contain:

1. The relevant responsibilities and authorities of each of the coordinating agencies.
2. As appropriate, procedures, schedules and responsibilities for development of nonattainment or maintenance area plans or plan revisions and for determining reasonable further progress.
3. Assurances for adequate plan implementation.
4. Procedures and responsibilities for tracking plan implementation.
5. Responsibilities for preparing demographic projections including land use, housing, and employment.
6. Coordination with transportation programs.
7. Procedures and responsibilities for adoption of control measures and emissions limitations.
8. Responsibilities for collecting air quality, transportation and emissions data.
9. Responsibility for conducting air quality modeling.
10. Responsibility for administering and enforcing stationary source controls.

11. Provisions for the timely and periodic sharing of all data and information among the signatories relating to:
    (a) Demographics.
    (b) Transportation.
    (c) Emissions inventories.
    (d) Assumptions used in developing the model.
    (e) Results of modeling done in support of the plan.
    (f) Monitoring data.

G. Each agency that commits to implement any emission limitation or other control measure, means or technique contained in the implementation plan shall describe that commitment in a resolution adopted by the appropriate governing body of the agency. The resolution shall specify the following:
1. Its authority for implementing the limitation or measure as provided in statute, ordinance or rule.
2. A program for the enforcement of the limitation or measure.
3. The level of personnel and funding allocated to the implementation of the measure.

H. The state, in accordance with the rules adopted pursuant to section 49-404, and the governing body of the metropolitan planning organization shall adopt each nonattainment or maintenance area plan developed by a certified metropolitan planning organization. The adopted nonattainment or maintenance area plan shall be transmitted to the department for inclusion in the state implementation plan provided for under section 49-404.

I. After adoption of a nonattainment or maintenance area plan, if on the basis of the reasonable further progress determination described in subsection F of this section or other information, the control officer determines that any person has failed to implement an emission limitation or other control measure, means or technique as described in the resolution adopted pursuant to subsection G of this section, the control officer shall issue a written finding to the person, and shall provide an opportunity to confer. If the control officer subsequently determines that the failure has not been corrected, the county attorney, at the request of the control officer, shall file an action in superior court for a preliminary injunction, a permanent injunction, or any other relief provided by law.

J. After adoption of a nonattainment or maintenance area plan, if, on the basis of the reasonable further progress determination described in subsection F of this section or other information, the director determines that any person has failed to implement an emission limitation or other control measure, means or technique as described in the resolution adopted pursuant to subsection G of this section, and that the control officer has failed to act pursuant to subsection I of this section, the director shall issue a written finding to the person and shall provide an opportunity to confer. If the director subsequently determines that the failure has not been corrected, the attorney general, at the request of the director, shall file an action in superior court for a preliminary injunction, a permanent injunction, or any other relief provided by law.

K. Notwithstanding subsections A and B of this section, in any metropolitan area with a metropolitan statistical area population of less than two hundred fifty thousand persons, the governor shall designate an agency that meets the criteria of section 174 of the clean air act and that is recommended by the city

that causes the metropolitan area to exist and the affected county. That agency shall prepare and adopt the nonattainment or maintenance area plan. If the governor does not designate an agency, the department shall be certified as the agency responsible for the development of a nonattainment or maintenance area plan for that area.

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Authorizing Statute

A.R.S. § 49-425

A.R.S. § 49-425. *Rules; hearing*

A. The director shall adopt such rules as he determines are necessary and feasible to reduce the release into the atmosphere of air contaminants originating within the territorial limits of the state or any portion thereof and shall adopt, modify, and amend reasonable standards for the quality of, and emissions into, the ambient air of the state for the prevention, control and abatement of air pollution. Additional standards shall be established for particulate matter emissions, sulfur dioxide emissions, and other air contaminant emissions determined to be necessary and feasible for the prevention, control and abatement of air pollution. In fixing such ambient air quality standards, emission standards or standards of performance, the director shall give consideration but shall not be limited to the relevant factors prescribed by the clean air act.

B. No rule may be enacted or amended except after the director first holds a public hearing after twenty days' notice of such hearing. The proposed rule, or any proposed amendment of a rule, shall be made available to the public at the time of notice of such hearing.

C. The department shall enforce the rules adopted by the director.

D. All rules enacted pursuant to this section shall be made available to the public at a reasonable charge upon request.

Exhibit E-III

Public Notice and Affidavit of Publication of Notice

Public Notice

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY PUBLIC COMMENT PERIOD AND HEARING ON THE PROPOSED ARIZONA STATE IMPLEMENTATION PLAN REVISION, ATTAINMENT PLAN FOR THE WEST PINAL PM_{10} PLANNING AREA (1987 NAAQS)

The Arizona Department of Environmental Quality (ADEQ) opens a 30-day public comment period with the publication of this notice on October 19, 2015, for the proposed 2015 West Pinal Moderate PM_{10} Nonattainment Area State Implementation Plan. The plan demonstrates that the West Pinal PM_{10} planning area will meet the 1987 health and welfare based 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) by December 2018.

A public hearing on the proposed attainment plan will be held at 11:00 a.m. on Thursday, November 19, 2015, at the Maricopa Agricultural Center Multipurpose Room, 37860 W. Smith-Enke Rd., Maricopa, AZ 85138. All interested parties will be given an opportunity at the public hearing to submit verbal and written comments. To request an auxiliary aid or service for accessible communication, contact Alicia Pollard, Human Resources Assistant, at (602) 771-4791 or aap@azdeq.gov, or dial 7-1-1 for TTY/TTD Services.

Copies of the proposal are available for review Monday through Friday between 8:30 a.m. and 4:30 p.m. at the ADEQ Records Center, 1110 W. Washington St., Phoenix, AZ 85007, (602) 771-4712. A copy of the proposal can also be viewed at the Pinal County Air Quality Department, 31 N. Pinal Street, Bldg. F, Florence, AZ 85132, (520) 866-6929, or online at http://www.azdeq.gov/ by selecting Air Quality – Public Notices, Meetings, and Hearings.

Written comments may be mailed to Catherine Lucke-McDowell, Air Quality Division, State Implementation Plan Section, Arizona Department of Environmental Quality, 1110 W. Washington St., Phoenix, AZ 85007, faxed to (602) 771-2366, or e-mailed to Lucke-McDowell.Catherine@azdeq.gov. Mailed comments must state the name and mailing address of the person; be signed by the person, their agent, or attorney; and clearly set forth reasons why this proposed attainment plan should or should not be finalized. Grounds for comment are limited to whether or not this proposed attainment plan meets the criteria spelled out in federal air pollution control laws and/or rules.

Comments must be received by ADEQ no later than November 19, 2015, by 5:00 p.m. or submitted at the public hearing. This proposed attainment plan will be submitted to the U.S. EPA following consideration of all comments received during the public comment period and hearing.

348 345

AFFIDAVIT OF PUBLICATION

ADEQ
AIR QUALITY DIVISION

15 OCT 22 AM 11: 19

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY PUBLIC COMMENT PERIOD AND HEARING ON THE PROPOSED ARIZONA STATE IMPLEMENTATION PLAN REVISION, ATTAINMENT PLAN FOR THE WEST PINAL PM10 PLANNING AREA (1987 NAAQS)

The Arizona Department of Environmental Quality (ADEQ) opens a 30-day public comment period with the publication of this notice on October 19, 2015, for the proposed 2015 West Pinal Moderate PM10 Nonattainment Area State Implementation Plan. The plan demonstrates that the West Pinal PM10 planning area will meet the 1987 health and welfare based 24-hour PM10 National Ambient Air Quality Standard (NAAQS) by December 2018. A public hearing on the proposed attainment plan will be held at 11:00 a.m. on Thursday, November 19, 2015, at the Maricopa Agricultural Center Multipurpose Room, 37860 W. Smith-Enke Rd., Maricopa, AZ 85138. All interested parties will be given an opportunity at the public hearing to submit verbal and written comments. To request an auxiliary aid or service for accessible communication, contact Alicia Pollard, Human Resources Assistant, at (602) 771-4791 or aap@azdeq.gov, or dial 7-1-1 for TTY/TTD Services.

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Written comments may be mailed to Catherine Lucke-McDowell, Air Quality Division, State Implementation Plan Section, Arizona Department of Environmental Quality, 1110 W. Washington St., Phoenix, AZ 85007, faxed to (602) 771-2366, or e-mailed to Lucke-McDowell.Catherine@azdeq.gov. Mailed comments must state the name and mailing address of the person; be signed by the person, their agent, or attorney; and clearly set forth reasons why this proposed attainment plan should or should not be finalized. Grounds for comment are limited to whether or not this proposed attainment plan meets the criteria spelled out in federal air pollution control laws and/or rules. Comments must be received by ADEQ no later than November 19, 2015, by 5:00 p.m. or submitted at the public hearing. This proposed attainment plan will be submitted to the U.S. EPA following consideration of all comments received during the public comment period and hearing.

THE ARIZONA REPUBLIC

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Tabitha James, being first duly sworn, upon oath deposes and says: That she is a Supervisor of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

October 19, 20, 2015

Sworn to before me this
20th day of
October A.D. 2015

BRIAN BILLINGS
Notary Public - Arizona
Maricopa County
My Commission Expires
July 25, 2018

Notary Public

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY PUBLIC COMMENT PERIOD AND HEARING ON THE PROPOSED ARIZONA STATE IMPLEMENTATION PLAN REVISION, ATTAINMENT PLAN FOR THE WEST PINAL PM10 PLANNING AREA (1987 NAAQS)

The Arizona Department of Environmental Quality (ADEQ) opens a 30-day public comment period with the publication of this notice on October 19, 2015, for the proposed 2015 West Pinal Moderate PM10 Nonattainment Area State Implementation Plan. The plan demonstrates that the West Pinal PM10 planning area will meet the 1987 health and welfare based 24-hour PM10 National Ambient Air Quality Standard (NAAQS) by December 2018.

A public hearing on the proposed attainment plan will be held at 11:00 a.m. on Thursday, November 19, 2015, at the Maricopa Agricultural Center Multipurpose Room, 37860 W. Smith-Enke Rd., Maricopa, AZ 85138. All interested parties will be given an opportunity at the public hearing to submit verbal and written comments. To request an auxiliary aid or service for accessible communication, contact Alicia Pollard, Human Resources Assistant, at (602) 771-4791 or aap@azdeq.gov, or dial 7-1-1 for TTY/TTD Services.

Copies of the proposal are available for review Monday through Friday between 8:30 a.m. and 4:30 p.m. at the ADEQ Records Center, 1110 W. Washington St., Phoenix, AZ 85007, (602) 771-4712. A copy of the proposal can also be viewed at the Pinal County Air Quality Department, 31 N. Pinal Street, Bldg. F, Florence, AZ 85132, (520) 866-6929, or online at http://www.azdeq.gov/ by selecting Air Quality - Public Notices, Meetings, and Hearings.

Written comments may be mailed to Catherine Lucke-McDowell, Air Quality Division, State Implementation Plan Section, Arizona Department of Environmental Quality, 1110 W. Washington St., Phoenix, AZ 85007, faxed to (602) 771-2366, or e-mailed to Lucke-McDowell.Catherine@azdeq.gov. Mailed comments must state the name and mailing address of the person; be signed by the person, their agent, or attorney; and clearly set forth reasons why this proposed attainment plan should or should not be finalized. Grounds for comment are limited to whether or not this proposed attainment plan meets the criteria spelled out in federal air pollution control laws and/or rules. Comments must be received by ADEQ no later than November 19, 2015, by 5:00 p.m. or submitted at the public hearing. This proposed attainment plan will be submitted to the U.S. EPA following consideration of all comments received during the public comment period and hearing.

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Tabitha James, being first duly sworn, upon oath deposes and says: That she is a Supervisor of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

October 19, 20, 2015

Sworn to before me this
20th day of
October A.D. 2015

BRIAN BILLINGS
Notary Public - Arizona
Maricopa County
My Commission Expires
July 25, 2018

Notary Public

Exhibit E-IV

Public Hearing Agenda

AIR QUALITY DIVISION

PUBLIC HEARING
ON THE PROPOSED
ARIZONA STATE IMPLEMENTATION PLAN (SIP) REVISIONS FOR THE
WEST PINAL 1987 PM_{10} NONTATTAINMENT AREA

PLEASE NOTE THE MEETING LOCATION AND TIME:
Maricopa Agricultural Center Multipurpose Room
37860 W. Smith-Enke Rd.
Maricopa, AZ 85138
November 19, 2015, 11:00 A.M.

Pursuant to 40 CFR § 51.102 notice is hereby given that the above referenced meeting is open to the public.

1. Welcome and Introductions

2. Purpose of the Oral Proceedings

3. Procedure for Making Public Comment

4. Brief Overview of the Proposed SIP Revisions

5. Oral Comment Period

6. Adjournment of Oral Proceeding

Copies of the proposal are available for review at the ADEQ Records Center, First Floor, 1110 W. Washington Street, Phoenix, Arizona 85007, (602) 771-4712, and at the Pinal County Air Quality Department, 31 N. Pinal Street, Bldg. F, Florence, AZ 85132, (520) 866-6929. The proposal can also be viewed online at http://www.azdeq.gov/cgi-bin/vertical.pl?d=2457346. For additional information regarding the hearing, please contact Catherine Lucke-McDowell, ADEQ Air Quality Division, at (602) 771-4216 or Lucke-McDowell.Catherine@azdeq.gov.

To request an auxiliary aid or service for accessible communication, contact ADEQ Human Resources at (602) 771-4792 or dial 7-1-1 for TTY/TTD Services. This document is also available in alternative formats by contacting ADEQ, TTD (602)771-4829.

Exhibit E-V

Public Hearing Sign-in Sheet

ADEQ
Arizona Department of Environmental Quality

Air Quality Division Sign-In Sheet

Please Sign In

SUBJECT 2015 West Pinal PM_{10} (1987) Nonattainment SIP Hearing DATE 11/19/15

	NAME	ORGANIZATION	PHONE	FAX	E-MAIL
1.	Ryan Templeton	ADEQ	602-771-4230		rct@azdeq.gov
2.	Heidi Haggerty	ADEQ	602-771-4815		hh4@azdeq.gov
3.	Joonwon Joo	ADOT	602-712-7166		JJoo@azdot.gov
4.	KAZI HAQUE	CITY OF MARICOPA	520-316-6985		KAZI.HAQUE@maricopa-az.gov
5.	Beverly Chenausky	ADOT	602-712-6269		BChenausky@Azdot.gov
6.	Mike Sundblom	PCAQCD	520-866-6915		michael.sundblom@pinalcounty.az.gov
7.	STEPHEN MILLER		520-866-7401		STEVE.MILLER@PINALCOUNTY.GOV
8.	TIMOTHY FRANKQUIST	ADEQ	602-771-4684		tsf@azdeq.gov

Air Quality Division Sign-In Sheet – p ___ of ___

9.	Josh DeZeeuw	PCAQCD	520-866-6960	joshua.dezeeuw@pinalcountyaz.gov
10.	Scott DiBiase	PCAQCD	520 866 6969	scott.dibiase@pinalcountyaz.gov
11.	Kale Walch	PCAQCD	520-866-6860	kale.walch@pinalcountyaz.gov
12.	Marina Mejia	ADEQ	602-771-4858	mm23@azdeq.gov
13.				
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Exhibit E-VI

Public Hearing Officer Certification

ADEQ
Arizona Department of Environmental Quality

Air Quality Division

Public Hearing Presiding Officer Certification

I, Naveen Savarirayan, the designated Presiding Officer, do hereby certify that the public hearing held by the Arizona Department of Environmental Quality was conducted on November 19, 2015, at the the Maricopa Agricultural Center Multipurpose Room at 37860 W. Smith-Enke Rd., Maricopa, AZ 85138, in accordance with public notice requirements by publication *The Arizona Republic* beginning October 19, 2015. Furthermore, I do hereby certify that the public hearing was recorded from the opening of the public record through concluding remarks and adjournment, and the transcript provided contains a full, true, and correct record of the above-referenced public hearing.

Dated this 19th day of November 2015.

State of Arizona

County of Maricopa

Subscribed and sworn to before me on this 19th day of November, 2015.

OPHELIA BEGAY
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
February 11, 2018

Notary Public

My commission expires: Feb. 11, 2018

Exhibit E-VII

Compilation of Comments and State Responses

RESPONSIVENESS SUMMARY

to

Written Comments Received on Arizona State's *2015 West Pinal Moderate PM_{10} Nonattainment Area SIP* under the Clean Air Act to allow for *Implementation of the 1987 PM10 National Ambient Air Quality Standard*

The Arizona Department of Environmental Quality (ADEQ) has made corrections to the State Implementation Plan revision to reflect grammatical and editorial errors. Also, ADEQ adjusted information regarding Pinal County's proposed construction and fugitive dust rules to reflect the rules' finalizations. Pinal County's rulemaking documentation was added as Appendix H. In addition, a brief discussion was added to Section 6.2.3.8 in order to provide clarity regarding the practical implementation of the fugitive dust rule.

The oral proceeding on the proposed *2015 West Pinal Moderate PM_{10} Nonattainment Area SIP* was held on Thursday, November 19, 2015, 11:00 a.m., Maricopa Agricultural Center Multipurpose Room at 37860 W. Smith-Enke Road, Maricopa, AZ 85138. The public comment period began on October 19, 2015, and closed on November 19, 2015. No oral comments were received during the public hearing. Received written comments and the Arizona Department of Environmental Quality's (ADEQ) responses are below. The two comment letters are also attached.

EPA Comment #1:

(EPA's comment letter begins on page 13 of this Exhibit)

First, the proposed Plan's emissions inventory relies on estimates of agricultural activity based on data from the 2007 U.S. Department of Agriculture (USDA) Agricultural Census (AgCensus). The proposed Plan assumes no growth in agricultural emissions from 2008 through 2018. USDA's 2012 AgCensus, however, shows increased agricultural activity in Pinal County between 2007 and 2012. We recommend that the Plan's emissions inventory incorporate updated estimates, such as those in the 2012 AgCensus, to project 2018 emissions from 2008 estimates, or provide a reasonable justification for the lack of growth in agricultural activity from 2008 to 2018, in light of the USDA 2012 AgCensus data.

ADEQ Response to EPA Comment #1:

ADEQ does not believe that that USDA Census reported increase in total cropland between 2007 and 2012 is representative of future conditions. The USDA AgCensus reported an 18% increase in total cropland acreage in Pinal County between the 2007 and 2012.[1] This increase occurred during a period of time that was optimal for agricultural crop production in Pinal County. During this period, economic recession resulted in a slowing of residential and commercial growth, as

[1] The census notes total cropland acreage increasing from 256,042 acres in 2007 to 302,591 acres in 2012.

evidenced by the decrease in issued construction permits (please see Appendix B, Table 3-67). Concurrently, crop commodity prices increased significantly, according to agricultural representatives in the County. The combination of surging commodity prices and decreasing land price competition due to the slowing of urban development caused the fringe agricultural community (i.e. those farmers who only operate or increase production during periods of ideal commodity prices) to increase production during this period. ADEQ does not see this as a likely scenario in the future due to a number of national economic variables as well as resource limitations and cost.

Long-term growth of most economic sectors in Pinal County is primarily limited by available water resources within the region.[2] Per Arizona's Groundwater Management Act, planned subdivisions in Active Management Areas (AMAs)[3] require developers to assure water supply for communities for 100 years from either a "city, town or private water company designated as having an assured water supply" by ADWR or by securing independent water resources and obtaining a "certificate of assured water supply."[4] The Arizona Department of Administration anticipates continued population growth for the County into the future.[5] The resulting competition for water rights between agricultural and urban development uses in the region is expected to negatively affect fringe agriculture in Pinal County. Increased water competition is already being realized by the agricultural community, which proposes to relinquish a reported 96,295 acre feet of Non-Indian Agricultural (NIA) priority Central Arizona Project (CAP) water in 2017, in accordance with the Arizona Water Settlements Act.[6] Also, according to the U.S. Secretary of Interior's shortage criteria issued in 2007, during a shortage Arizona would have to implement mandatory Colorado River water restrictions if Lake Mead hits a threshold depth of 1,075 ft.[7] Hence, the State of Arizona could experience further reduced allocations of water moving into the future if Lake Mead drops to a level of 1,075 ft. Further, CAP's prioritizes municipal, industrial, and Indian water uses as having the "highest priority and [are] the last to be reduced in times of shortage," unlike non-Indian agricultural water use.[8] In the negotiation for CAP water, Arizona agricultural CAP subcontractors agreed to junior priority water rights in

[2] For additional information, see Section 4.2.7 of Appendix F to the SIP Document (RACM Analysis).
[3] The entire West Pinal PM_{10} Nonattainment Area is covered piecemeal by three AMAs, as noted in Section 4.2.7 (p. 37) of Appendix F (RACM Analysis) of the SIP document.
[4] *See* A.R.S. § 45-576(A), (B), & (J) (2015); *see also id*. §§ 9-463.01(I), 11-822(A).
[5] Arizona Department of Administration (ADOA) low series population projections were utilized in the 2015 West Pinal Moderate PM_{10} Nonattainment Area SIP. These projections predict continued countywide population growth, with a doubling of the current population by 2043 (based on information downloaded from https://population.az.gov/population-projections on 11/23/2015).
[6] *See* Department of Water Resources (ADWR), Fiscal Year 2015 Annual Report at 11, *available at* http://www.azwater.gov/AzDWR/documents/ADWRDirector/2015%20ADWR%20Annual%20Report.pdf*; see also* Arizona Water Settlement Act §104(a)(2)(A), 43 U.S.C. 1504(a)(2)(A) (2004); ADWR, Non-Indian Agricultural Priority Central Arizona Project Water Reallocation Final Process and Evaluation Criteria (Feb. 2013), *available at* http://www.azwater.gov/azdwr/PublicInformationOfficer/documents/2013-02-11FINALNIAProcessandCriteria.pdf.
[7] The Secretary of the Interior, Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Dec. 2007), *available at* http://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf.
[8] ADWR, Future Water Distribution CAP Priority System, *available at* http://www.azwater.gov/AzDWR/StateWidePlanning/CRM/FutureWaterDistribution.htm (last visited Nov. 25, 2015).

exchange for subsidized rates, and "when CAP supplies are cut back, subcontracts for non-Indian agriculture will be reduced first."[9] Hence, a river water shortage would likely negatively impact non-Indian agricultural land uses in a Colorado River dependent area, such as Pinal County.

The anticipated reduction in agricultural water resources and increased competition for water due to population growth in the region cause ADEQ to conclude that utilizing 2012 crop agricultural production is not a reasonable surrogate for 2018 production. ADEQ's assertion is further supported by agricultural land use records supplied by the Pinal County Assessor's Office.[10] Acreage of Pinal County land in 2008 that was attributed to agricultural use totaled 363,107 acres, while in 2012 this grew to 467,094 acres. This compares to the growth observed in the AgCensus between 2007 and 2012. However, the County assessor also reported that for 2015, total agricultural acreage within the County had reduced to 347,580 acres. This reduction demonstrates a downward trend in agricultural production to levels lower than in 2008. Therefore, based on information received from the Pinal County Assessor, 2008 agricultural production is a conservatively high estimate for current crop agricultural production.

Given current agricultural production levels, resource limitation and competition, and uncertain future commodity prices, ADEQ does not believe that 2012 is a characteristic year for projecting agricultural production.

EPA Comment #2:

Second, the proposed Plan's attainment demonstration should provide additional explanation and justification for the selection or exclusion of each candidate design day at each PM10 monitor. For example, the proposed Plan's supporting documentation should provide a rationale for not selecting April 26, 2008 as a stagnation design day at the Stanfield monitor. The proposed Plan suggests that this day was considered, but provides no further analysis or basis for the State's rejection of this day. Similarly, the proposed Plan should provide additional explanation for not selecting September 8, 2008 as the high wind design day at the Stanfield monitor. This day was not reviewed despite having a 24-hour average PM10 concentration of 264 micrograms/cubic meter compared to 178.6 micrograms/cubic meter on the selected design day, November 21, 2008.

ADEQ Response to EPA Comment #2:

Candidate design day selection occurred during the initial technical analysis planning stages of

[9] Symposium: Water Law and Policy Conference: Patching the Holes in the Bucket: Safe Yield and the Future of Water Management in Arizona, 49 Ariz. L. Rev. 361, 369 (fn 32. "In exchange for receiving CAP water at subsidized rates through 2030 from the Central Arizona Water Conservation District ('CAWCD'), irrigation districts holding CAP non-Indian agricultural subcontracts relinquished their subcontract rights. After 2030, there is no guarantee that CAP water will be available to agriculture at subsidized rates. CAP supplies with the non-Indian agriculture priority will be used in the future to meet municipal demands and will be the first supplies reduced when Colorado River deliveries are reduced due to drought conditions."); *accord* Arizona Water Settlement Agreement §§ 5.1, 7, 8.2 (Aug. 16, 2004), *available at* http://www.cap-az.com/documents/departments/water-operations/Arizona-Water-Settlement-Agreement12-14-07.pdf.

[10] ADEQ email correspondence with John Ellinwood (Oct. 28, 2015).

the State Implementation Plan (SIP) preparation. Design day determination was a collaborative effort by a committee consisting of ADEQ, Pinal County Air Quality Control District (PCAQCD), Sierra Research, and EPA. The design day selection methods outlined in the Inventory Preparation Plan (IPP), submitted as Appendix A in the SIP, and the resultant design days selected were approved in an email from EPA to ADEQ on July 22, 2013. To alleviate any and all concerns, ADEQ discussed design day methodology and adequacy with EPA leading up to this approval. The methods by which design days were chosen are also described in Appendix A of the proposed 2015 West Pinal Moderate PM_{10} Nonattainment Area SIP and to a lesser degree in Appendix B of the SIP.

ADEQ believes it would be overly burdensome to include justification of the exclusion of every potential design day in the SIP, given the number of potential candidate days in Pinal County. For example, ADEQ modeled seven unique design days covering four exceeding monitors under two meteorological conditions. In the selection of the Cowtown high-wind design day, there were 38 days in 2008 that had at least one hour of winds exceeding 12 mph and exceeded the standard. This represents only one of the seven design day selections. However, below, ADEQ discusses the reasons for excluding the two design days specifically identified in EPA's comment:

Stanfield, April 26, 2008:
Exceedance days were ranked from highest to lowest concentration. Any date that with winds exceeding 12 mph were excluded as these exceedances would not be expected to exhibit stagnation conditions. Additionally, any exceedance day that occurred on a weekend day was excluded from the analysis. Weekend days were unlikely to contain an adequate representation of normal day emission producing activities. The exclusion of weekend day exceedances precluded the use of April 26, 2008 as this was a Saturday.

Stanfield, September 8, 2008:
Exceedance days were ranked from highest to lowest concentration. Next, exceedance days were filtered to only include those days with multiple hours of winds exceeding 12 mph (the design day selection committee determined that 7 hours of high winds were necessary for inclusion). The highest recorded average hourly wind speed for September 8, 2008 was 5.364 m/s which converts to 11.999 mph. Additionally, this wind speed only occurred for one hour, failing to meet the minimum threshold of consecutive high wind hours.

EPA Comment #3:

Third, to address the quantitative milestones requirement, we recommend that the proposed Plan incorporate specific metrics to assess progress over the 2016 through 2018 implementation period. Because the control strategy supporting the attainment demonstration is based entirely on the implementation of the Agricultural Best Management Practices (Ag BMP) Rules (18-2-610, 610.03, 611, 611.03, 612, 612.01), we recommend that one metric be a 2017 review of BMPs selected by irrigation districts and farms engaged in cropland farming and animal operations as recorded in their BMP Program General Permit Record Forms, due December 31, 2015 and March 31, 2017. The proposed Plan states that voluntary farm surveys will be used in a 2017 implementation review of the assumptions made in the Plan's attainment

demonstration. Instead, we recommend that Arizona Department of Environmental Quality (ADEQ) obtain General Permit Record Forms and collect aggregate data concerning the type and extent of BMPs used by a statistically valid preponderance of producers in each crop and animal operation category. For example, we recommend aggregate data be collected by crop/animal operation/unpaved road BMP category and associated acreage/mileage controlled or mitigated. To the degree that there is a shortfall in emission reductions, then additional control measures should be adopted and implemented prior to December 31, 2017.

ADEQ Response to EPA Comment #3:

As stated in the plan (Section 7.2), ADEQ will submit a report that demonstrates how emissions reductions compare to those scheduled by the beginning of 2017, as well as analyze the correlation between the plan and monitoring data and whether the area is still anticipated meet its scheduled attainment date. ADEQ will make such a demonstration using agricultural compliance data if there is inadequate survey information. To clarify, such three year surveys are not voluntary; the surveys are required by the Agricultural rules.[11]

Per EPA policy, states submit CAA § 189(c) reasonable further progress demonstrations three years from the regulatory SIP submission date, rather than three years from the actual submission date.[12] However, per the new agricultural rules,[13] such survey data will not be available in time for the first RFP report (per EPA policy), which ADEQ intends to submit in the beginning of 2017. In the absence of such survey data, ADEQ will use inspection and compliance data to demonstrate progress.

As an inspection process standard, ADEQ's Compliance Section generally requests to review general permit record forms. ADEQ may supplement additional progress demonstrations with inspection and compliance for future reports, if such data is more representative. ADEQ will determine progress by analyzing survey and compliance data collected, such as acreage of cropland and operator implemented best management practices per the rule. ADEQ believes that the proposed reports and means of obtaining data will be sufficient to demonstrate progress.

EPA Comment #4:

Fourth, the proposed Plan identifies mitigation of emissions from public unpaved roads as a contingency measure if the area fails to make reasonable further progress or attain the NAAQS by the attainment date, December 31, 2018. The proposed Plan does not, however, adequately distinguish between public unpaved roads at which mitigation measures have already been implemented since 2008 and public unpaved roads that could be addressed through mitigation

[11] EPA mentions the submission of General Permit Record Forms. These forms are not submitted. These forms are required to be completed from and after December 31, 2015 and are thereafter required to be completed every year by March 31st. These forms are kept on site and shall be available upon request to ADEQ.
[12] Fine PM NAAQS, SIP Requirements, Proposed Rule, 80 FR 15340, 15390 (Mar. 23, 2015).
[13] *e.g.* R18-2-610.03(D) from Final Exempt Agricultural Rules, 21 A.A.R. 1156, 1169 (July 24, 2015).

measures in 2016, 2017, and 2018. In addition, ADEQ's submittal of the Plan should include documentation from entities responsible for meeting this requirement showing that they have the legal authority and fiscal resources to do so, and a list of roadway segments that will be mitigated. The Plan should make clear the timing, location, and accountability for each public unpaved road mitigation project, either implemented and assumed within the Plan's baseline, or credited as a contingency measure within the Plan.[2]

ADEQ Response to EPA Comment #4:

The SIP calculations account for which measures have been implemented since 2008 and which roads could be addressed in 2016, 2017, and 2018. ADEQ has compiled a list of completed and draft projects, which is available upon request. ADEQ finds it unnecessarily burdensome on outside agencies to include such information with the plan.

According to A.R.S. § 49-479, Pinal County's Board of Supervisors, "shall adopt such rules as it determines are necessary and feasible to control the release into the atmosphere of air contaminants originating within the territorial limits of the county or multi-county air quality control region in order to control air pollution…" By adopting the Pinal County fugitive dust rule, the Board has deemed it necessary to regulate government owned roads to control PM_{10}. The fugitive dust rule is applicable to all public entity owners of unpaved roads. In the case that the entities collectively fall short of paving the necessary length of road, all entities shall be held jointly and severally strictly liable for the violation. All entities are therefore incentivized, in order to avoid conflict and legal and penal expense, to reach a decision amongst themselves to pave the nonattainment area roads, as required. Additionally, once the MVEB is approved, entities will be further incentivized to pave roads in accordance with the rule. They will have to pave in accordance with planned TIP projects to allow for the area to conform to the approved SIP budget and TIP projects. Nonconformity could result in numerous negative impacts for all involved, including a possible dearth of federal funding of future development projects.

EPA Comment #5:

Fifth, the motor vehicle emissions budget (MVEB) and related analyses should be revised to meet transportation conformity requirements. The MVEB includes an "allowance" or "safety margin" for road construction projects. This "allowance/safety margin" increment of PM10 emissions should be calculated and presented as an element separate and distinct from the attainment based MVEB. Also, the MVEB includes a line item for "Private Road" emissions. We recommend that this source category be removed from the MVEB.

ADEQ Response to EPA Comment #5:

The commenter does not specifically address any unsatisfied transportation conformity requirements. ADEQ believes the MVEB demonstration is sufficient and meets conformity requirements. EPA's suggested adjustments do not appear to be requirements, but rather organizational preferences. ADEQ believes the MVEB to be reasonably adequate for approval in its current form.

ADEQ modeled attainment for all design days before considering any margin of safety. After modeling attainment, and "in order to leave as much room for growth in the MVEB as possible, ADEQ….scaled up the emissions rates from each road work project in the inventory until the model no longer showed attainment."[14] In other words, ADEQ included a margin of safety for emissions from transportation construction projects to provide for additional growth, while still meeting attainment. The addition of a margin of safety in no way affected ADEQ's anticipated attainment date.

The motor vehicle emissions budget (MVEB), attainment demonstration, and annual attainment emission inventory (presented respectively in Tables 5-4, 7-2, and 5-3 of the 2015 West Pinal Moderate PM_{10} Nonattainment Area SIP) all include this margin of safety. The annual nonattainment area-wide emissions associated with road construction from known projects are 88.1 tons of PM_{10}.[15] These 88.1 tons/year of known transportation construction project emissions were increased by an additional 91.4% to allow for the MVEB's margin of safety, but as to not allow any modeled monitor to exceed the standard for 2018 in the attainment demonstration. The 91.4% increase in emissions results in an additional 80.6 tons of emissions allowable each year (i.e. 91.4% of 88.1 tons).[16] The addition of the margin of safety emissions to already known transportation construction emissions results in total road construction emissions of 168.8 tons/year (i.e. 88.1 tons/year + 80.6 tons/year ≈ 168.8 tons/year).[17] If the margin of safety emissions in Table 5.4 of the SIP was represented as a separate line item, the resultant MVEB would be as presented in the table below:

MVEB Summary (separating margin of safety emissions)	
Source	Annual NA-Wide Emissions (TPY)
Exhaust, tire-, & brake-wear	173.7
Unpaved road dust	26,433.5
Reentrained paved road dust	1,211.1
Road construction/maintenance	88.1
Margin of safety added to road construction/maintenance	80.6
Total	27,987.1

[14] Appendix D (Attainment TSD) of SIP at 43.
[15] *Id*.
[16] *Id*.
[17] Please note that the example summation of 88.1 tons/year and 80.6 tons/year actually results in emissions of 168.7 tons/year, but ADEQ is reporting 168.8 tons/year to keep consistency with the values reported in the SIP MVEB presented in Table 5-4. The reason for this discrepancy is truncation of the actual calculated emission values in this example.

Finally, ADEQ does not feel that removal of private roads from the MVEB is appropriate. ADEQ included private unpaved roads in the MVEB in part to be regionally consistent with other MVEBs in the state. Also, non-irrigation unpaved private road travel produces a significant proportion of transportation related emissions within the Pinal County PM_{10} nonattainment area. As presented in Table D4-1 of Appendix D of the proposed SIP, non-irrigation private unpaved roads were estimated to emit 9,133.5 tons per year of PM_{10}. The proposed MVEB totals 27,987.1 tons of PM_{10} per year. Therefore, non-irrigation private unpaved roads represent 32.6% of the total proposed MVEB. Given the relative importance of this transportation emission sector to the total MVEB and to provide consistency between the other Arizona nonattainment area MVEBs, ADEQ has determined that private unpaved road emissions should be included in the Pinal County PM_{10} nonattainment area MVEB.

Volkswagen (VW) Comment #1:

(Volkswagen's comment letter begins on page 17 of this Exhibit)

Generally, Volkswagen is concerned that some of the language in Pinal County's fugitive dust rule is unclear and requests that the language be clarified. (*This comment has been paraphrased*)

ADEQ Response to VW #1:

ADEQ understands that Volkswagen Arizona Proving Grounds ("VW AZ Proving Grounds"), a vehicle testing facility located in Pinal County, AZ within the West Pinal PM10 Nonattainment Area, seeks clarification as to how Pinal County's fugitive dust rule in Pinal County Air Quality Control District Code of Regulations, Chapter 4, Article 1 (§ 4-1-010, -015, -020, -020, -030, -040, -045, and -050) applies to the facility.[18] The facility also specifically seeks clarification as to whether the vehicle testing facility exemption in PCAQCD Code § 4-1-015(1) (effective Jan. 1, 2016) covers the activities that the facility believes should be exempt from the fugitive dust rule. After consideration of the rule and consultation with Pinal County Air Quality Control District, ADEQ concludes that the vehicle testing exemption is suitably broad and that the rule is sufficiently clear. However, please discuss all matters responded to herein specifically with Pinal County Air Quality Control District (PCAQCD), as it is agency authorized to enforce the rule.

VW Comment #2:

VW is unclear regarding the vehicle testing facility exemption applicability. Does evaluating and conditioning test tracks meet the vehicle testing facility exemption in Pinal County's fugitive dust rule? Does the vehicle testing facility exemption apply at all times? Finally, does the exemption apply during driver training? (*This comment has been paraphrased*)

ADEQ Response to VW Comment #2:

The applicable standards of Pinal County's fugitive dust rule exempts those "specified activities" at vehicle test and development facilities "…where dust is required to test and validate the design

[18] These rules were approved and finalized by the Board of Supervisors on October 28, 2015. Final West Pinal PM10 Moderate Nonattainment Area Fugitive Dust Rule, 21 A.A.R. 2925, Nov. 20, 2015 (effective Jan. 1, 2016).

integrity…" of car products for an equipment manufacturer.[19] This exemption applies to vehicle testing facilities such as VW AZ Proving Grounds.

A test track is a location where dust is required to test and validate the design integrity of cars. This is the exact type of location that the rule contemplates as a location where such "specified activities" are likely to take place. If controlling the dust on the track between testing periods would demean the nature of the track's testing qualities, the lack of control would seem to fall under the exemption, whether testing is done on consecutive days or not. Similarly, track preparation and evaluation is a necessary activity for testing and safety purposes. Therefore, track preparation and evaluation are done in furtherance of such "specified activities" that the rule contemplates and the exemption applies to these activities. It also follows that employed or contracted drivers will need to train under the same or similar conditions as during vehicle testing, and such training is necessary to allow for safe and accurate vehicle testing.

ADEQ and Pinal County therefore interpret the rule to allow the vehicle testing exemption to apply to driver training and associated tracks, and track evaluation and preparation because such activities are necessary to test and validate car product design integrity. Hence, any location or activity on the facility where dust is required to maintain the veracity of a vehicle test, including tracks, track site evaluation or preparation, and driver training needed to ensure that drivers have the skill and safety acumen in order to test the vehicles, is exempt from the requirements of this rule.

These test or training track locations would not become subject to this rule unless the testing nature of these locations ends indefinitely or Pinal County reasonably perceives that the locations have not been used for testing purposes for a reasonably extended period of time and considers them subject to the rule.

ADEQ appreciates the suggestion that Pinal County include additional information regarding the exemption applicability to test track evaluation and preparation and driver training, but finds that the additional language is unnecessary to reasonably interpret the exemption as covering these activities.

VW Comment #3:

The proposed rules define UNPAVED ROADS as those owned by federal, state, county, municipal and other governmental or quasi-governmental agencies. Thus, UNPAVED ROADS on private property do not appear to be within this category.

The proposed rules also define UNPAVED LOTS as any area not paved that is used for parking, maneuvering, materials handling, or storing motor vehicles such as auto impound yards, wrecking yards, auto dismantling yards, save yards, and storage yards. As indicated previously, in addition to dirt test tracks designed to test vehicles causing dust intrusion and dirt test areas designed to train drivers, the VW facility includes unpaved roads used by security, maintenance and utility vehicles. Under the proposed definitions, such private property unpaved roads would appear to be classified as UNPAVED LOTS, since they would experience occasional vehicle traffic. VW is requesting clarification of this

[19] Pinal's Fugitive Dust Final Rule, PCAQCD Code § 4-1-015(1) (effective Jan. 1, 2016).

interpretation, so that it understands which controls, if any, are required with respect to the unpaved roads located within the facility.

ADEQ Response to VW Comment #3:

An unpaved road under the proposed Pinal County fugitive dust rule "means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles."[20]

From the definition above, ADEQ finds that the term "unpaved roads" clearly only applies to government owned roads and therefore does not apply to privately owned roads. Hence, VW AZ Proving Grounds would not have to maintain its roads in accordance with this rule as it pertains to unpaved roads.

VW AZ Proving Grounds' private unpaved roads would not have to apply controls in accordance with this rule as long as the unpaved road is used as a means for travel,[21] and it is not regularly used for generally stationary or space limited purposes such as parking, maneuvering, material handling, or storing vehicles as a lot[22] would be used. If the areas mentioned are used as unpaved lots, they will be regulated under the rule as unpaved lots.

[20] Pinal's Fugitive Dust Final Rule, PCAQCD Code § 4-1-020(16) (effective Jan. 1, 2016).
[21] Merriam-Webster Dictionary defines "road" as "a hard flat surface for vehicles, people, and animals to travel on." *See* Definition of "Road," Merriam-Webster, *available at* http://www.merriam-webster.com/dictionary/road.
[22] Merriam-Webster Dictionary defines "lot" as "a portion of land" or " a measured parcel of land having fixed boundaries and designated on a plot or survey" or "an establishment for the storage or sale of motor vehicles." *See* Definition of "Lot," Merriam-Webster, *available at* http://www.merriam-webster.com/dictionary/lot.

VW Comment #4:

Portions of the VW test facility are vacant open areas. In most cases, natural vegetation has been established and is maintained. In certain areas, however, it is necessary to mow the natural vegetation (i.e, tumbleweeds, etc.) to a height of approximately five inches in order to prevent the vegetation from blowing onto the dust test tracks where it could endanger the safety of the drivers who are testing vehicles at high speeds. The proposed regulations are unclear concerning which, if any, regulatory requirements apply to that activity. For example, since mowers transit the open vegetative areas when mowing, they could qualify as UNPAVED LOTS. Or, they could be considered OPEN AREASN ACANT LOTS. Or they could be considered DISTURBED SURF ACE AREAS since in many cases the areas were disturbed many years ago, even though natural vegetation has reestablished itself. Finally, the act of mowing could be classified as qualifying under the section entitled Restriction on Removing Vegetation. Sec. 4-1-030 E. The act of mowing vegetation to a height of five inches, does not lend itself to the types of controls required when removing vegetation, which seems to be the focus of this section of the proposed rules. VW is, therefore, asking that the rules be clarified relating to the mowing activities that are conducted solely for safety related to the high speed dust vehicle intrusion testing on the unpaved tracks.

ADEQ Response to VW Comment #4:

Per the proposed rule, Disturbed Surface Area is not regulated as a specific emitting source. "Unpaved lots" and "open areas/vacant lots" are regulated sources. An "open area/vacant lot" may contain "disturbed surface area" so that the open area/vacant lot must be controlled per the proposed rule.

An "unpaved lot" as used in the rule is any area that is not paved and that is *used for parking, maneuvering, material handling, or storing motor vehicles and equipment*. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities."[23]

From the description from VW AZ Proving Grounds, the land in question is not used for the purposes of storage, parking, material handling, or maneuvering. From available information then, the land does not seem to meet the description of "unpaved lot." The question seems to be whether mowing is a type of maneuvering that would be regulated under "unpaved lot." However, the purposes of mowing are not to maneuver, park, storage, or even handling materials. The purpose of mowing is to maintain the vegetation on the land, a description not covered in the "unpaved lot" description. The described plot of land does seem to fall under the "open areas/vacant lot" description. Under the proposed rule, "open areas/vacant lot" means:

> "…a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.

[23] Pinal's Fugitive Dust Final Rule, PCAQCD Code (effective Jan. 1, 2016) (emphasis added).

b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.

c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership."[24]

The land VW AZ Proving Grounds described appears to be subdivided commercial land that contains no approved buildings or structures, which would therefore qualify it as an open area/vacant lot that must be controlled under the rule. Maintaining vegetation is a possible control measure for such source type because vegetation and roots help to stabilize the earth and prevent PM10 from being easily re-entrained. However, please consult with Pinal County for further clarification as to how to apply the control measures specifically to VW AZ Proving Grounds' open areas. Further, mowing vegetation to five inches does not qualify as removing vegetation. Removing vegetation might be, as an example, pulling vegetation from the roots so that the roots fail to stabilize the land, or blading, discing, or plowing so as to overturn the surface crust and disturb the earth. Further, if VW AZ Proving Grounds were to remove vegetation, removal would need to occur in conjunction with implementation of one or more of the specific control measures outlined in the Pinal's Fugitive Dust Final Rule, PCAQCD Code § 4-1-030(2)(C).

[24] Pinal's Fugitive Dust Final Rule, PCAQCD Code § 4-1-020(8) (effective Jan. 1, 2016).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

NOV 19 2015

Mr. Eric Massey
Director, Air Quality Division
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, Arizona 85007

Dear Mr. Massey:

Thank you for the opportunity to provide comments on the proposed "2015 West Pinal Moderate PM10 Nonattainment Area SIP" (West Pinal County PM_{10} Attainment Plan or the Plan), released for public comment on October 19, 2015. This letter highlights several issues that we believe should be addressed before submittal of the Plan to EPA. As discussed below, our comments concern the following five elements of the proposed Plan: the emissions inventory, the attainment demonstration, quantitative milestones and reasonable further progress, contingency measures, and transportation conformity.

First, the proposed Plan's emissions inventory relies on estimates of agricultural activity based on data from the 2007 U.S. Department of Agriculture (USDA) Agricultural Census (AgCensus). The proposed Plan assumes no growth in agricultural emissions from 2008 through 2018. USDA's 2012 AgCensus, however, shows increased agricultural activity in Pinal County between 2007 and 2012.[1] We recommend that the Plan's emissions inventory incorporate updated estimates, such as those in the 2012 AgCensus, to project 2018 emissions from 2008 estimates, or provide a reasonable justification for the lack of growth in agricultural activity from 2008 to 2018, in light of the USDA 2012 AgCensus data.

Second, the proposed Plan's attainment demonstration should provide additional explanation and justification for the selection or exclusion of each candidate design day at each PM_{10} monitor. For example, the proposed Plan's supporting documentation should provide a rationale for not selecting April 26, 2008 as a stagnation design day at the Stanfield monitor. The proposed Plan suggests that this day was considered, but provides no further analysis or basis for the State's rejection of this day. Similarly, the proposed Plan should provide additional explanation for not selecting September 8, 2008 as the high wind design day at the Stanfield monitor. This day was not reviewed despite having a 24-hour average PM_{10} concentration of 264 micrograms/cubic meter compared to 178.6 micrograms/cubic meter on the selected design day, November 21, 2008.

[1] For example, total cropland acreage increased 18 percent. See USDA 2012 Census of Agriculture – County Data (Pinal County, Arizona), Table 8, Farms, Value of Land and Building, and Land Use, 2007-2012.

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Third, to address the quantitative milestones requirement, we recommend that the proposed Plan incorporate specific metrics to assess progress over the 2016 through 2018 implementation period. Because the control strategy supporting the attainment demonstration is based entirely on the implementation of the Agricultural Best Management Practices (Ag BMP) Rules (18-2-610, 610.03, 611, 611.03, 612, 612.01), we recommend that one metric be a 2017 review of BMPs selected by irrigation districts and farms engaged in cropland farming and animal operations as recorded in their BMP Program General Permit Record Forms, due December 31, 2015 and March 31, 2017. The proposed Plan states that voluntary farm surveys will be used in a 2017 implementation review of the assumptions made in the Plan's attainment demonstration. Instead, we recommend that Arizona Department of Environmental Quality (ADEQ) obtain General Permit Record Forms and collect aggregate data concerning the type and extent of BMPs used by a statistically valid preponderance of producers in each crop and animal operation category. For example, we recommend aggregate data be collected by crop/animal operation/unpaved road BMP category and associated acreage/mileage controlled or mitigated. To the degree that there is a shortfall in emission reductions, then additional control measures should be adopted and implemented prior to December 31, 2017.

Fourth, the proposed Plan identifies mitigation of emissions from public unpaved roads as a contingency measure if the area fails to make reasonable further progress or attain the NAAQS by the attainment date, December 31, 2018. The proposed Plan does not, however, adequately distinguish between public unpaved roads at which mitigation measures have already been implemented since 2008 and public unpaved roads that could be addressed through mitigation measures in 2016, 2017, and 2018. In addition, ADEQ's submittal of the Plan should include documentation from entities responsible for meeting this requirement showing that they have the legal authority and fiscal resources to do so, and a list of roadway segments that will be mitigated. The Plan should make clear the timing, location, and accountability for each public unpaved road mitigation project, either implemented and assumed within the Plan's baseline, or credited as a contingency measure within the Plan.[2]

Fifth, the motor vehicle emissons budget (MVEB) and related analyses should be revised to meet transportation conformity requirements. The MVEB includes an "allowance" or "safety margin" for road construction projects. This "allowance/safety margin" increment of PM_{10} emissions should be calculated and presented as an element separate and distinct from the attainment based MVEB. Also, the MVEB includes a line item for "Private Road" emissions. We recommend that this source category be removed from the MVEB.

To conclude, we look forward to working with the State in addressing these concerns and others we have discussed previously with your staff. As presented here, EPA's comments are not exhaustive and we may have more or different comments in subsequent reviews of the proposed Plan or its supporting documents. Any comments EPA provides today do not substitute for our final action after public review and comment on our proposed action on the State's submitted

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[2] In its Notice of Proposed Rulemaking for the Fugitive Dust Rule, Pinal County Air Quality Control District describes the regulated community for mitigating public unpaved roads under the rule to include the County, and the municipalities of Casa Grande, Maricopa, Florence, Coolidge, Eloy, and Queen Creek (page 1735, *Arizona Administrative Register*, Volume 21, Issue 35, August 28, 2015).

plan. If you have any questions regarding our comments, please contact me at (415) 972-3851 or Colleen McKaughan at (520) 498-0118.

Sincerely,

Matthew Lakin
Manager, Planning Office
Air Division

cc via email: Lindy Bauer, Maricopa Association of Governments
Michael Sundblom, Pinal County Air Pollution Control District

349602

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November 16, 2015

HAND - DELIVERED

Lesley Forst
Air Quality Division
State Implementation Plan Section
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, AZ 85007
via email forst.lesley@azdeq.gov

Re: Public Comment Period for 2015 West Pinal Moderate PM10 Non-Attainment Area SIP

Dear Mr. Forst:

We are writing on behalf of Volkswagen Group of America ("VW"), which owns and operates the VW Arizona Proving Grounds which is a vehicle test facility in Maricopa County, Arizona, located within the EPA designated moderate PM-10 Non-Attainment Area. As a result, the facility would be subject to applicable provisions of the proposed SIP. VW appreciates the opportunity to submit comments on the 2015 West Pinal Moderate PM10 Non-Attainment Area SIP.

The VW Test Facility includes multiple test processes including unpaved test tracks, unpaved security/ maintenance/utility roads, open unpaved areas, and paved areas and structures. As set forth below, VW is concerned that some of the proposed rules are unclear and requests that the language be clarified to avoid future misinterpretations. This is critical in as much as the proposed rules are scheduled to be in effect on January 1, 2016

APPLICABILITY

The proposed rules on fugitive dust include a section entitled General Applicability, Section 4-1-010. According to that General Applicability provision, the new rules apply to the following: (1) OPEN AREAS/VACANT LOTS, (2) UNPAVED ROADS, (3) UNPAVED

LOTS, and (4) PUBLIC ROADWAYS. The rules thereafter set forth controls required to mitigate fugitive dust.

EXEMPTIONS

Section 4-1-015 of the proposed rules contains five exemptions. The first exemption includes the following:

> "In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality, and/or commercial acceptance, those specified activities shall be exempt from the applicable standard requirements of this article."

VW appreciates the consideration given to vehicle test facilities under the proposed rules and that ADEQ and Pinal County recognize that vehicle testing requires the generation of dust including fugitive dust resulting from vehicle testing. VW, however, is requesting additional clarification relating to certain aspects of the exemption.

DIRT TEST TRACK ISSUES

The above exemption is clear that during active vehicle testing, when dust is required to test and validate the design integrity, etc. of the vehicle tested, the fugitive dust requirements do not apply. The wording of the proposed rule, however, raises several issues.

First, in order to conduct dust testing of the vehicles on the dirt test tracks, the test tracks must be periodically evaluated and then conditioned to ensure that it meets the necessary testing parameters. Those activities may need to be done at test speeds which also creates dust. Evaluation and conditioning of the dirt test tracks are critical components to the testing of the vehicles for dust intrusion, but it is not part of the actual vehicle testing itself. The proposed exemption language is unclear concerning whether such test track evaluation and conditioning is also exempt. The purpose of the evaluation and conditioning is to ensure that the dust generating capability is appropriate. VW submits that it is inconsistent to require dust suppression as part of the evaluation/conditioning, which would necessarily result in the consistency of the dirt test track being different from the actual vehicle testing conditions.

Second, the exemption is also unclear concerning when the exemption no longer applies. During different times of the year, the intensity of vehicle testing on the dirt test track varies. At times it is Monday through Friday, but not on weekends or holidays while other times it may be less frequent. Thus, it is not unusual for vehicles to utilize the dirt test track for dust intrusion testing five days a week, ending late Friday, and resume on Monday the following week. The proposed rule is unclear concerning how long in between vehicle tests the exemption is no longer

applicable. VW has adopted a dust control plan, based generally upon the equivalent Maricopa County Fugitive Dust requirements, that provides that if the vehicle test track is not used for four consecutive days, that appropriate stabilization would be initiated. That was intended to allow for weekends and holidays. Thus, if vehicle testing is performed on a Friday, but is not resumed on the first non-holiday the following week, stabilization would be required. VW requests that a similar period of time be specified in the rule or that the rule incorporate a reasonable time reference. VW further requests clarification concerning the status of the dirt test tracks when vehicle testing is no longer applicable, and stabilization is required. In that situation, VW asks clarification whether the non-used vehicle test track would qualify as an UNPAVED LOT for purposes of required controls. VW needs to understand what category of controls it must apply, during those periods of time when the test tracks are not exempt.

Third, as part of vehicle dust intrusion testing, drivers are required to undergo a driver training course to ensure that they have the required skills to safely conduct vehicle dust testing at high speeds on the dirt tracks. This testing is a safety issue to protect both the driver and other personnel at the facility. The driver training and testing is conducted on the dirt test tracks and other unpaved areas. VW is concerned because without further clarification, the driver training/test area, which is also a critical component to the actual vehicle dust testing, could be considered "UNPAVED LOT" which would impose additional control requirements. Such control requirements, however, would change the nature of the dirt area used for the driver training and testing which would compromise its validity in ensuring the drivers are trained and qualified to operate at high speeds on the dirt test tracks.

In view of the foregoing issues, VW requests consideration that the current exemption be amended to include the following additional sentence: "This includes all actions necessary to the vehicle testing such as test track evaluation and preparation and driver training."

UNPAVED MAINTENANCE ROADS

The proposed rules define UNPAVED ROADS as those owned by federal, state, county, municipal and other governmental or quasi-governmental agencies. Thus, UNPAVED ROADS on private property do not appear to be within this category.

The proposed rules also define UNPAVED LOTS as any area not paved that is used for parking, maneuvering, materials handling, or storing motor vehicles such as auto impound yards, wrecking yards, auto dismantling yards, save yards, and storage yards. As indicated previously, in addition to dirt test tracks designed to test vehicles causing dust intrusion and dirt test areas designed to train drivers, the VW facility includes unpaved roads used by security, maintenance and utility vehicles. Under the proposed definitions, such private property unpaved roads would appear to be classified as UNPAVED LOTS, since they would experience occasional vehicle

traffic. VW is requesting clarification of this interpretation, so that it understands which controls, if any, are required with respect to the unpaved roads located within the facility.

OPEN VEGITATED AREAS

Portions of the VW test facility are vacant open areas. In most cases, natural vegetation has been established and is maintained. In certain areas, however, it is necessary to mow the natural vegetation (i.e, tumbleweeds, etc.) to a height of approximately five inches in order to prevent the vegetation from blowing onto the dust test tracks where it could endanger the safety of the drivers who are testing vehicles at high speeds. The proposed regulations are unclear concerning which, if any, regulatory requirements apply to that activity. For example, since mowers transit the open vegetative areas when mowing, they could qualify as UNPAVED LOTS. Or, they could be considered OPEN AREAS/VACANT LOTS. Or they could be considered DISTURBED SURFACE AREAS since in many cases the areas were disturbed many years ago, even though natural vegetation has reestablished itself. Finally, the act of mowing could be classified as qualifying under the section entitled Restriction on Removing Vegetation. Sec. 4-1-030 E. The act of mowing vegetation to a height of five inches, does not lend itself to the types of controls required when removing vegetation, which seems to be the focus of this section of the proposed rules. VW is, therefore, asking that the rules be clarified relating to the mowing activities that are conducted solely for safety related to the high speed dust vehicle intrusion testing on the unpaved tracks.

CONCLUSION

The purpose of the foregoing comments on behalf of VW are to ensure that the proposed regulations achieve the goals sought by Pinal County and ADEQ, while at the same time avoiding lack of clarity that could lead to confusion in the best case, and notices of violation in the worst case, due to an honest misinterpretation of what the regulations require. VW believes that to the extent the above issues can be clarified by ADEQ and Pinal County, the risk of misunderstanding is significantly reduced. VW would again like to thank ADEQ and Pinal County for considering its earlier request for exemptions from the dust control requirements for vehicle dust intrusion testing required at the test facility. If you have any questions concerning these comments, please don't hesitate to contact the undersigned.

Yours very truly,

FENNEMORE CRAIG, P.C.

Phillip F. Fargotstein

PFF/bz
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Exhibit E-VIII

SIP Hearing Transcript

PROPOSED ARIZONA AIR QUALITY
STATE IMPLEMENTATION PLAN (SIP)
FOR THE WEST PINAL 1987 PM_{10} NONTATTAINMENT AREA

Oral Proceeding

Transcript

November 19, 2015

Naveen Savarirayan : Good afternoon, and thank you for coming. I now open this hearing on the proposed revisions to Arizona's State Implementation Plan, or SIP, for the West Pinal 1987 PM_{10} Nonattainment Area.

This proceeding is being recorded and will be preserved for the record.

Today is November 19, 2015, and the time is 11:06 p.m., a.m., I am sorry. The location is the Maricopa Agricultural Center Multipurpose Room at 37860 W. Smith-Enke Road, Maricopa, AZ 85138. My name is Naveen Savarirayan, and I have been appointed by the Director of the Arizona Department of Environmental Quality (ADEQ) to preside over this proceeding.

The purpose of this proceeding are to provide the public an opportunity to:
(1) Hear about the substance of the proposed SIP revisions, and
(2) Present oral argument, data, and views regarding the revisions in the form of comments on the record.

Department representatives for today's hearing are Ryan Templeton, Heidi Haggerty, and Marina Mejia of the Air Quality Division's State Implementation Plan Section.

Public notice of the SIP revisions was published in the Arizona Republic on October 19 and 20, 2015, and was also provided on ADEQ's website. Paper copies of the proposed SIP revisions were made available at the ADEQ Records Center in Phoenix and at the Pinal County Air Quality Department in Florence starting October 19, 2015, and will remain available until the close of comment period, which is at 5:00 p.m. today.

If you wish to make a verbal comment, you need to fill out a speaker slip, which is available at the sign-in table at the back, and bring it to the front. Using speaker slips allows everyone an opportunity to be heard and allows us to match the name on the official record with the comments. You may also submit written comments to the Department today.

Please note the comment period for the proposed SIP revisions ends today and all comments must be received by 5:00 p.m.

Comments made during the formal comment period are required by law to be considered by the Department when preparing the final State Implementation Plan submission for the Environmental Protection Agency. This is done through the inclusion of a responsiveness summary in which the Department responds in writing to written and oral comments made during the formal comment period and at this hearing.

The agenda for this hearing is as follows:

First, Heidi will present a brief overview of the proposed revisions to the State Implementation Plan.

Then I will conduct the oral comment period. At that time, I will begin to call speakers in the order that I have received speaker slips.

Please be aware that any comments at today's hearing that you want the Department to formally consider must be given either in writing or on the record during the oral comment period of this hearing.

At this time, Heidi Haggerty will give a brief overview of the proposed revision relating to the West Pinal 1987 PM10 Nonattainment Area. Heidi?

Heidi Haggerty: Thanks, Naveen.

In 1987, the U.S. Environmental Protection Agency promulgated a new 24-hour PM_{10} standard. The PM_{10} standard includes particles with a diameter of 10 micrometers or less (in other words, 0.0004 inches or one-seventh the width of a human hair). The standard was set at 150 micrograms per cubic meter (µg/m3). Hence, an ambient air quality monitor attaining the standard could not measure volumetric levels of particulate matter with a diameter of 10 micrometers or less in an amount greater than 150 micrograms per cubic meter (µ/m3) more than once per year on average over a consecutive three-year period.

Effective July 2, 2012, the U.S. Environmental Protection Agency redesignated a portion of western Pinal County from "unclassifiable" to nonattainment, meaning the area was not meeting the 1987 promulgated 24-hour PM_{10} National Ambient Air Quality Standards (or NAAQS).

In response to the nonattainment designation, ADEQ and its partners developed a comprehensive state implementation plan to reduce emissions to healthy levels. The proposed plan is comprised of Agricultural, Construction, and other fugitive dust control measures to ensure that the West Pinal area attains the 1987 PM_{10} standard by the end of 2018.

* * * * *

Mr. Savarirayan: This concludes the explanation period of this proceeding on the proposed revisions to the State Implementation Plan.

* * * * *

I now open this proceeding for oral comments.

Has anyone filled out a speaker slip or would like to make an oral comment at this time?

Seeing that there are no speaker slips, this concludes the oral comment period of this proceeding.

* * * * *

If you have not already submitted written comments, you may submit them to me at this time. Again, the comment period for these proposed revisions to the State Implementation Plan ends today at 5:00 p.m.

Thank you for attending.

The time is now 11:12 a.m.. I now close this oral proceeding.

Appendix F

RACM Analysis for the West Pinal County PM_{10} Nonattainment Area

Arizona Department of Environmental Quality

Final
December 21, 2015

This document was developed with the assistance of:
Sierra Research Inc.
1801 J Street
Sacramento, CA 95811

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1.0 INTRODUCTION

1.1 Purpose and Background

This document provides Arizona Department of Environmental Quality's (ADEQ) analysis of reasonably available control measures (RACM) for emission sources within the West Pinal PM_{10} Nonattainment Area.

Effective July 2, 2012, the U.S. Environmental Protection Agency (EPA) redesignated a portion of western Pinal County, Arizona from "unclassifiable" to "nonattainment" for the 1987 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS).[1] Redesignation was based on recorded violations of the air quality standard at ambient monitoring sites within the area. In the same action, the EPA also classified the area as a "moderate" nonattainment area, triggering specific Clean Air Act (CAA) requirements for Arizona to revise its State Implemenation Plan (SIP) in a manner demonstrating that the area would attain the 1987 PM_{10} NAAQS.

CAA Sections 172(c)(1) and 189(a)(1)(C) require that moderate nonattainment area SIP revisions include emissions reductions from existing sources of PM-10 emissions, as may be obtained through RACM and reasonably available control technology (RACT). RACM and RACT must be implemented as "expeditiously as practicable" and "shall provide for the attainment of the [NAAQS]."[2] However, if an area is classified as moderate, a State must implement RACM no later than four years after designation.[3]

The "General Preamble" to the 1990 CAA Amendments and other policy and guidance documents partially describe the methodology to determine RACM.

According to the law and interpretive guidance, all significant[4] point, area, onroad and nonroad sources are herein evaluated for existing and potential control through RACM/RACT measures.

1.2 EPA Guidance

1.2.1 RACM/RACT Guidance

The U.S. EPA's April 1993, *PM-10 Guideline Document* (*1993 Guidance*) and the *General Preamble* both outline how to evaluate control strategies for moderate PM_{10} nonattainment areas. EPA advises that "[t]he suggested starting point for specifying RACM in each SIP is the listing of available control measures for fugitive dust, residential wood combustion, and prescribed burning, including measures selected from among those listed in the appendices to the *General Preamble*."[5]

Control measures may not be reasonable for all sources because some sources produce "insignificant (i.e., *de minimis*)" levels of emissions.[6] Measures to control insignificant sources may then be excluded for

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[1] See generally, *Designation of Areas for Air Quality Planning Purposes; State of Arizona; Pinal County; PM_{10}*, 77 FR 32024, May 31, 2012.
[2] Clean Air Act § 172(c)(1), 42 U.S.C. 7502(c)(1) (1990).
[3] Clean Air Act § 189(a)(1)(C), 42 U.S.C. 7513(a)(1)(C) (1990).
[4] *i.e*. control measures for such sources result in more than *de minimis* emission reduction levels
[5] Office of Air Quality Planning and Standards, U.S. Envtl. Prot. Agency, *PM-10 Guideline Document* 8-10 (April 1993) [hereinafter *PM-10 Guideline Document*]; *see also General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*, 57 FR 13498, 13540, Apr. 16, 1992.
[6] *General Preamble*, 57 FR 13540.

further consideration if it can be shown the sources are in fact insignificant.[7] Hence, a good starting point for a RACM analysis is to identify reasonable sources to control, which are those sources that contribute more than insignificant (i.e. significant) emissions.

RACT is the lowest emission limitation that a particular existing source can meet by applying control technology that is reasonably available considering technological and economic feasibility.[8] In moderate nonattainment areas, existing "major stationary sources should be the minimum starting point for a RACT analysis."[9] However, guidance further indicates that a RACT analysis should not be limited to major stationary sources, and should apply to other existing stationary sources in the area that are reasonable to control given the area's attainment needs.[10]

A preliminary list of control measures may be 1) found in the General Preamble appendices, 2) introduced by public comment, and 3) found in other similar areas' SIPs.[11] However, not all controls are required to be adopted and implemented.[12] A state should evaluate for reasonableness the preliminary list of "available" control measure, and through this process, some measures may be rejected, in full or in part, as unreasonable.[13] The *General Preamble* characterizes "reasonableness" as the "technological feasibility and the cost of control in the area to which the SIP applies."[14] A SIP submittal should contain a reasoned and documented justification for partial or full rejection of any available control measures, explaining the infeasibility and unreasonableness of the measures.

For the control of public sector sources, specifically, [the RACM/RACT] evaluation "should consider the impact of the reasonableness of the measures on the municipal or other governmental entity that must bear the responsibility for their implementation (e.g., paving of unpaved public roads)."[15] If control measures are infeasible to implement in full, "a State should consider the feasibility of implementing measures in part."[16]

Finally, when the process for determining RACM is completed, the selected measures should be "converted into a legally enforceable vehicle (e.g., a regulation or permit program)" and should meet "EPA's criteria regarding the enforceability of SIPs and SIP revisions."[17]

1.2.2 BACM Guidance for Additional Clarification

The CAA Amendments of 1990 established two tiers of PM_{10} nonattainment area classifications: moderate and serious. Areas newly designated nonattainment for the PM_{10} standard, such as Western Pinal County, are typically classified as moderate areas. If an area is not forecast to attain within four years of the effective date of nonattainment, then EPA is required to classify the area as serious and the area must adopt best available control measures (BACM) to affect emissions reductions.

The available guidance depicts BACM as being more stringent than RACM, but concludes that BACM should be developed in a very similar manner as RACM. Consequently, during the RACM process,

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[7] *Id.*; *See also PM-10 Guideline Document, supra* note 6, at 8-11.
[8] *Id.*
[9] *General Preamble*, 57 FR 13541; s*ee also PM-10 Guideline Document, supra* note 6, at 8-11.
[10] *Id.*
[11] *See General Preamble*, 57 FR 13540.
[12] *General Preamble*, 57 FR 13540-13541; *see also PM-10 Guideline Document, supra* note 6, at 8-10 – 8-11.
[13] *Id.*
[14] *Id.*
[15] *General Preamble*, 57 FR 13541.
[16] *Id.*
[17] *Id.*; *see also PM-10 Guideline Document, supra* note 6, at 8-11.

ADEQ referred to BACM guidance for clarification of terms and processes not explained in RACM guidance.

For example, in a moderate area RACM analysis, candidate measures can be excluded from consideration if the measures would reduce emissions only from sources or source categories that are determined to be de minimis, or not contributing significantly to exceedances of the PM10 standards. EPA guidance does not define de minimis or significant impact levels in RACM determinations. Some specificity is provided, however, in the clarification of these terms in BACM guidance. According to BACM guidance, a source category "will be presumed to contribute significantly to a violation of the 24-hour NAAQS if its PM-10 impact at the location of the expected violation would exceed 5 $\mu g/m^3$."[18] ADEQ bases its significant source conclusions on this BACM guidance statement.

1.3 RACM Analysis Process Summary

The step-by-step process for evaluating potential control measure application to point, area, onroad, and nonroad emission source categories follows:

1. Determine the significant sources contributing to violations of the air quality standards,
2. List available control measures (*General Preamble*, other air districts, public comment),
3. Evaluate the list of "available" measures for "reasonableness" (technological and economic feasibility),
4. Provide reasoned justification for the rejection, in whole or in part, of any candidate control measure affecting a significant source,
5. Determine the emissions reductions due to the selected measures and evaluate whether the measures will lead to attainment of the NAAQS as expeditiously as practicable,
6. Ensure final measures are legally enforceable (codified in rule, permit, etc.).

Evaluation of significant sources and potential new control measures for the West Pinal area are discussed in Sections 2 through 4 below.

[18] *Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*, 59 FR 41998, 42011, Aug. 16, 1994.

2.0 SOURCE EVALUATION FOR THE WEST PINAL PM_{10} NONATTAINMENT AREA

2.1 Identification of Significant Sources (Direct/Primary Emissions)

To guide the preparation of PM_{10} control strategies for the West Pinal County Nonattainment Area, ADEQ analyzed ambient monitoring and emissions data for a period when violations of the PM_{10} standard occurred. Analysis of 2008 base year monitoring data showed that two separate meteorological scenarios produce exceedances of the 24-hour PM_{10} NAAQS at or above 155µg/m^3:[19] high wind and stagnation (i.e., low wind speed and mixing height) conditions.[20] The emission source combinations that contribute to elevated concentrations are fundamentally different under each meteorological scenario. On stagnation days, emissions are activity based (e.g., re-entrained dust from a vehicle driving on a roadway). On high wind days, additional emissions are generated by wind blowing across disturbed surfaces (e.g., an area cleared of vegetation). Therefore, for control strategy analysis, ADEQ chose representative design days (days with recorded exceedances of the 24-hour PM_{10} NAAQS) for high wind conditions and for stagnation conditions.

ADEQ selected the following monitors and correlated dates as representative of stagnant (low wind) meteorological conditions leading to elevated ambient concentrations:

- Cowtown – October 30, 2008,
- Pinal County Housing (PCH) – October 29, 2008, and
- Stanfield – October 29, 2008.

ADEQ selected the following monitors and correlated dates as representative of high wind conditions:

- Cowtown – April 27, 2008,
- Pinal County Housing (PCH) – January 1, 2008,
- Stanfield – November 21, 2008, and
- Maricopa – October 27, 2008.

Separate modeling domains were defined for each monitor and base scenario (pre-attainment-controls) emissions inventories developed for each domain for 2008 and 2018. Inventories for both windblown and activity-based emissions were created. Dispersion modeling was then performed to identify emissions sources that have significant impacts on elevated ambient PM_{10}.[21] Source categories that did not contribute more than 0.5% of the design day emissions in any of the modeling domains were not included in stagnation or high-wind day source apportionment (ambient impact) modeling because their contributions were negligible. None of the source categories listed below individually contributed more than 0.5% to any of the emissions inventories:

- Nonroad,

[19] While the PM-10 NAAQS is 150µg/m^3, a violation does not occur until monitor concentrations are above the rounded value as dicated by 40 CFR 50, Appendix K. Appendix K states, "*Exceedance* means a daily value that is above the level of the 24-hour standard after rounding to the nearest 10 µg/m^3 (i.e., values ending in 5 or greater are to be rounded up)." Hence, a level of 155 µg/m^3 rounds up to an exceedance level of 160 µg/m^3, and any value between 150-154.9 rounds down to 150µg/m^3 and does not qualify as an exceedance.

[20] See *Appendix B, Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days (EI TSD)*.

[21] See *Appendix C, Pinal County PM10 Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days (Modeling TSD)*.

- Railroads,
- Fires,
- Residential Fuel Combustion, and
- Open Burning.[22]

Combined, these five categories totaled 0.19% of the base year nonattainment area-wide emissions inventory in 2008, 0.20% in 2018, and not more than 0.6%[23] in any of the design day modeling domains in either 2008 or 2018.[24] All other source categories individually contributed more than 0.5% to the emissions inventory on at least one of the design days within the associated modeling domain, and were therefore included in the source apportionment modeling.[25]

The EPA's BACM guidance definition of significant sources (and impacts), discussed in Section 1.2 EPA Guidance above, is sufficiently clear as to avoid challenges to interpretation. Thus, a point source or an area source category was not deemed significant unless its modeled contribution to PM_{10} concentrations on a stagnation or high wind design day exceeded 5 $\mu g/m^3$, on a 24-hour average basis.

Significant Sources/Land Uses that contribute more than 5 $\mu g/m^3$ for any design day are as follows:

- Agriculture (County),
- CAFOs,
- Construction,
- Cleared Areas,
- Desert Shrubland (County, Tribal),
- Developed Rural Lands,
- Developed Urban Lands,
- Unpaved Roads (Agricultural, Public, Private, Trails),
- Unpaved Parking Lots (activity-based, excludes windblown), and
- Paved Roads.

Some of the significant sources listed above are consistent with standard emissions source categories (e.g. unpaved roads, paved roads, construction, etc.). Certain area sources, such as wind blown emissions from vacant lots and unpaved parking areas, are grouped into more general land use categories for inventory purposes (e.g. Developed Rural Lands and Developed Urban Lands). Section 2.2 Description of Significant Sources lists the types of emitting activities found in each land use category.

Insignificant Sources/Land Uses modeled as individually contributing less than 5 $\mu g/m^3$ are described below:

- Unpaved Roads (Tribal, Test Tracks),
- Point Sources,

[22] These source categories each comprise less than 0.5% of the annual PM_{10} emissions inventory for the West Pinal County nonattainment area. See *Appendix B, Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days (EI TSD).*

[23] Without rounding or truncation the maximum actual combined value for any of the design days is 0.564% (Maricopa high-wind 2018).

[24] Because these values so small they may include noticeable rounding errors.

[25] See *Appendix B, Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days (EI TSD)* and *Appendix C, Pinal County PM10 Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days (Modeling TSD)*.

- Agriculture (Tribal),
- Dairies, and
- Other Windblown Dust [unclassified].

Combined, the maximum modeled 24-hour average impact of these five de minimis sources at any monitor is 3.7 $\mu g/m^3$ in 2008 (and 4.1 $\mu g/m^3$ in 2018; in either case, less than 5 $\mu g/m^3$). Because of the minimal impact of these sources, only some of which are under State or County jurisdiction, additional control would not advance attainment of the PM_{10} NAAQS. Non-significant source categories are more fully described in *Appendix C, Pinal County PM10 Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days (Modeling TSD).*

Emissions impacts in year 2018 were also calculated based on expected changes for each source category (e.g. planned road paving projects that have dedicated funding and schedules for completion) assuming no other additional controls.[26] If a source category was found to be significant for either the 2008 or 2018 base years at any of the monitors, the source category will be controlled as reasonable. No changes to the list of significant source categories were necessary, however, when comparing the ambient impacts of 2008 and 2018 emissions at each of the monitors. Apportionment modeling results for 2008 and 2018 are detailed in an accompanying report.[27] Source impact data for 2008 are summarized here in Table 1.

[26] See *Appendix B, Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days (EI TSD).*
[27] See *Appendix C, Pinal County PM10 Nonattainment Area Source Apportionment Modeling for 2008 and 2018 Base Scenario Design Days (Modeling TSD).*

Table 1: Summary of the West Pinal County Design Day (24-hour) Modeled Source Impacts for 2008 (µg/m³)								
Source Category		Low-Wind Modeled Impacts[28]			High-Wind Day Modeled Impacts[28]			
		Cowtown	PCH	Stanfield	Cowtown	PCH	Stanfield	Maricopa
Point Sources (permitted)		0.2	0.0	N/M	0.2	0.0	N/M	-
Construction Sites		0.9	0.0	0.2	**10.8**	0.0	0.0	**77.0**
Cleared Areas		N/M	N/M	N/M	1.2	**5.7**	2.6	**15.4**
Desert Shrubland	Non-Tribal	N/M	N/M	N/M	**35.1**	**20.5**	**18.4**	**8.5**
	Tribal	N/M	N/M	N/M	**6.9**	-	-	-
	Total	N/M	N/M	N/M	**42.0**	**20.5**	**18.4**	**8.5**
Developed Rural Lands		N/M	N/M	N/M	3.5	**9.9**	3.8	**6.3**
Developed Urban Lands		N/M	N/M	N/M	0.1	0.9	-	**6.9**
Other Windblown Dust [unclassified]		-	-	-	0.0	-	-	0.8
Dairies		-	0.0	0.0	-	-	0.0	-
CAFOs		**199.5**	-	**22.2**	**9.8**	-	**14.9**	0.0
Agriculture (Cropland)	Non-Tribal	0.1	**6.3**	**6.3**	**48.4**	**173.1**	**78.5**	**19.2**
	Tribal	0.1	-	-	0.1	-	-	0.0
	Total	0.2	**6.3**	**6.3**	**48.5**	**173.1**	**78.5**	**19.2**
Unpaved Roads	Agricultural	**9.6**	**28.5**	**60.0**	**13.6**	**21.2**	**21.6**	3.5
	Public	**13.5**	**72.5**	**24.5**	**10.0**	**7.6**	**13.3**	0.6
	Private (including irrigation)	1.2	**39.2**	**25.1**	**6.6**	**5.9**	4.6	1.9
	Trail	0.0	**10.3**	1.5	0.7	2.2	2.7	0.1
	Tribal	1.4	-	-	2.0	-	-	0.3
	Test Track	0.8	-	-	1.4	-	-	--
	Total	**26.5**	**150.5**	**111.1**	**34.3**	**36.9**	**42.1**	**6.4**
Unpaved Parking Lots[29]		0.1	**5.6**	**5.2**	0.1	0.1	0.2	0.3
Paved Roads		**5.6**	4.1	**5.6**	0.3	0.1	0.6	0.9
Total[30]		233.0	166.5	150.5	150.8	247.4	161.1	141.9

[28] Bold values indicate modeled concentrations are greater than the 5 µg/m³ 24-hour average significance threshold. N/M means "not modeled," indicating these source categories were not evaluated for low wind conditions. A Hyphen (-) indicates no emission sources of this type are located in the modeling domain.
[29] The "Unpaved Parking Lots" source category only includes activity-based emissions. The windblown dust emissions from unpaved parking lots are a subset of the windblown dust emissions from the land use categories on which the lots sit: Cleared Areas, Developed Rural Lands, and Developed Urban Lands.
[30] These totals only include the impacts of local sources, i.e., those within each modeling domain. Regional background concentrations of PM_{10} are not included.

2.2 Description of Significant Sources

Based on the modeling results, the sources within significant land use categories are listed below.[31]

Paved Roads (Public, Private)

Definition:

Any roadway or alleyway which has been covered by concrete or asphalt pavement.

Types of emitting sources/activities in this land use category include activity-based emissions from:

- Road dust (from airborne deposition) reentrained by motor vehicle travel over the road surface.
- Reentrained road dust from material tracked out onto paved roads from unpaved traffic surfaces (including track-out from agricultural, construction, and industrial sites).
- Emissions from shoulders of paved roads (including bow wake).
- Tailpipe exhaust, tire and brake wear.
- Reentrained road dust from water erosion and material spills onto paved roads.

Unpaved Roads (Public, Private, Agricultural)

Definition:

Any roadway or alleyway which has not been covered by concrete or asphalt pavement.

Types of emitting sources/activities in this land use category include activity-based and windblown emissions from:

- Dirt roads (County maintained, private).
- Trails.
- Roads with asphalt rock dust palliative (ARDP) applied.
- Railroad roadways.
- Agricultural roadways.
- Windblown dust from unpaved roadways under construction.
- Canal roads.
- Permanent unpaved haul/access roads (commercial, municipal, or industrial facilities) [generally included in point source emissions category up to the land ownership boundary, otherwise included in unpaved roads category].

Unpaved Parking Lots

Definition:

A land parcel that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. This significant source category only includes activity-based emissions. Windblown dust emissions from unpaved parking lots are included as a subset of the windblown dust emissions from the significant land use categories Cleared Areas, Developed Rural Lands, and Developed Urban Lands. Unpaved parking/staging areas for construction and agriculture are not included here, but are instead included under the construction and agriculture categories.

Types of emitting sources/activities in this land use category include activity-based emissions from:

- Road dust from motor vehicle travel over the unpaved or non-stabilized surface.

[31] Land use/source categories are more fully described in *Appendix B, Pinal County PM10 Nonattainment Area Emissions Inventories for 2008 and 2018 Base Years and Design Days (EI TSD)*.

Construction (Residential Construction, Commercial Construction, Site Development)

Definition:

Residential – A land parcel which is permitted for residential construction by Pinal County Air Quality Control District (PCAQCD) or which contains visible evidence of residential construction from aerial photography (e.g. unfinished residential structures and construction equipment).

Commercial – A land parcel which was permitted by PCAQCD for commercial construction for year 2008.

Site Development – A land parcel which had been significantly cleared of natural desert vegetation and is undergoing grading, filling, cutting, or trenching for infrastructure.

Road construction – A segment of road on which dust-producing construction or maintenance activities (such as milling or grading) occur. Only activity-based emissions from road work sites are included in the Construction category.

Types of emitting sources/activities in this land use category include activity-based and windblown emissions from:

- Land clearing and earthmoving activities.
- Haul trucks.
- Material handling, storage, and transport.
- Unpaved haul/access roads.
- Unpaved parking or staging areas.
- Other construction and demolition related activities.

Cleared Areas

Definition:

A land parcel which has been significantly cleared of natural desert vegetation, but does not contain a man-made structure or significant coverage by non-native vegetation. Includes areas subject to occasional vehicular traffic or other disturbance.

Types of emitting sources/activities in this land use category include windblown dust from:

- Unpaved parking and traffic areas.
- Vacant lots.
- Abandoned farms.
- Abandoned construction sites.
- Other cleared/disturbed areas.

Developed Lands – Urban

Definition:

A primarily residential land parcel which has been significantly cleared of natural desert vegetation, contains a man-made structure, and has a total area of land which is greater than ~50% covered by non-native vegetation (e.g. lawn grass), rock, buildings, or pavement. The average portions of these properties that are comprised of open, disturbed soils are estimated to be 5%. The significant source category most similar to the disturbed portions of developed urban lands is cleared areas. This land use category may also include commercial, municipal, or industrial facilities.

Types of emitting sources/activities in this land use category include windblown dust from:

- Man-made surfaces (from airborne deposition).
- Unpaved parking areas.
- Permanent unpaved haul/access roads, and parking or staging areas at commercial, municipal, or industrial facilities. [non-point source emissions]
- Smaller cleared areas (including vacant lots).
- Open areas subject to other disturbance (i.e. motorized vehicle traffic).

Developed Lands – Rural

Definition:

A primarily residential land parcel (generally ranging from 0.5 to 15 acres) which has been significantly cleared of natural desert vegetation, contains a man-made structure, but has a total area of land which is less than ~50% covered by non-native vegetation (e.g. lawn grass), rock, buildings, or pavement. Land coverage fractions on these parcels are small and have substantial portions of exposed soils, at least a portion of which is typically disturbed and susceptible to wind erosion during high wind conditions. May include commercial, municipal, or industrial facilities.

Types of emitting sources/activities in this land use category include windblown dust from:

- Unpaved parking areas.
- Permanent unpaved haul/access roads, and parking or staging areas at commercial, municipal, or industrial facilities. [non-point source emissions]
- Smaller cleared areas (including vacant lots).
- Open areas subject to other disturbance (i.e. motorized vehicle traffic).

Desert Shrublands

Definition:

A land parcel which has no significant clearing of natural vegetation and contains no man-made structures. These lands are generally undisturbed, although some areas are subject to limited recreational activities and livestock grazing. This land use category is a combination of public (BLM, State trust, etc.) and private land.

Types of emitting sources/activities in this land use category include windblown dust from:

- Off-road ("off-trail") recreational vehicle travel on open land. [exhaust is included in non-road calculations]
- Livestock grazing. [only relevant to the degree to which overgrazing may occur]

Agricultural Operations (Croplands)

Definition:

A land parcel identified through aerial photography as actively growing or showing signs of previously growing cultivated crops for agricultural purposes (this land use was verified by an external source from the Agricultural community for areas near ambient monitors and further subdivided into the types of crops grown in each field surrounding the Maricopa, Cowtown, Pinal County Housing, and Stanfield air monitors). When considering significant sources, tribal agriculture is excluded from this category.

Types of emitting sources/activities in this land use category include activity-based and windblown emissions from:

- Agricultural cropland activities (e.g. harvesting and/or tilling emissions).
- Windblown dust from croplands.
- Permanent unpaved haul/access roads, and parking or staging areas.

Confined Animal Feeding Operations (CAFOs)

Definition:

A land parcel identified as a Confined Animal Feeding Operation.

Types of emitting sources/activities in this land use category include activity-based and windblown emissions from:

- Animal movement.
- Animal waste.
- Permanent unpaved haul/access roads, parking or staging areas, and feed lanes.
- Handling and transport of feed and animal waste.

2.3 PM_{10} Precursors

Clean Air Act Section 189(e) requires the evaluation of precursor emissions from major stationary sources to determine whether emissions from these sources contribute significantly to PM_{10} levels which exceed the air quality standards. Under Section 189(e), a nonattainment plan's control requirements applicable to major sources of primary PM_{10} emissions (directly emitted), shall also apply to major stationary sources of PM_{10} precursors, but only if the sources contribute significantly to levels which exceed the air quality standard in the area.

Precursors are chemicals that can be converted in the atmosphere to form particles (secondary PM_{10}), which contribute to ambient PM_{10} levels. For example, emitted precursor compounds such as nitrogen oxides (NO_x), sulfur oxides (SO_x), or ammonia (NH_3) can react to form particulate sulfates, nitrates, and ammonium (ammonium sulfate and nitrate).

While "contribute significantly" is not defined in the Clean Air Act, EPA suggests that for serious PM_{10} nonattainment areas, "a source category will be presumed to contribute significantly to a violation of the 24-hour NAAQS if its PM_{10} impact at the location of the expected violation would exceed 5 $\mu g/m^3$."[32] EPA further defines source categories for which regulation will be required in serious PM_{10} areas as "categories of area-wide sources or large individual stationary sources of PM_{10} or PM_{10} precursor emissions that may be regulated under a specific rule, generic emission limit, or standard of performance, or a specific control program in a SIP."[33]

ADEQ estimated secondary PM_{10} emissions impacts at the Cowtown and Pinal County Housing (PCH) monitors by correlating worst impact day monitoring data, recorded during a year-long chemical mass balance characterization study, with sector-based annual emissions data from the 2008 EPA National Emissions Inventory (NEI).[34] These data were evaluated to determine which, if any, emissions sectors impact the monitors in question at a level exceeding 5 $\mu g/m^3$ (averaged over a 24-hr period), thus significantly contributing to violations of the PM_{10} 24-hour NAAQS. Any source that contributed

[32] See 59 FR 42011, August 16, 1994.
[33] *Id*. at 42010.
[34] 2008 NEI Version 3.

secondary PM_{10} to the monitor below this level was not considered significant. Details of the analysis are contained in the *West Pinal County PM_{10} Precursor Significance Determination* (see Appendix B, Exhibit BXVI).

As a result of the evaluation, ADEQ concluded that no source category exceeds the 5 $\mu g/m^3$ significant impact threshold for secondary PM_{10}. Table 2 summarizes the source sector secondary pollutant impacts at the Cowtown and PCH monitors (Nitrate, Sulfate, and Ammonium). The highest estimated contributing source category, on-road mobile, contributes less than 3.5 $\mu g/m^3$ of secondary PM to either monitor on the design days. No source of precursor emissions significantly contributes to exceedances of the PM_{10} standards, mitigating the need to develop control strategies for precursor source categories.

Table 2: Summary of Source Sector Secondary Pollutant Impacts at the Cowtown and PCH Monitors								
	Cowtown Concentration (µg/m^3)				PCH Concentration (µg/m^3)			
Emissions Inventory Sector	Ammonium	Nitrate	Sulfate	**Total Secondary**	Ammonium	Nitrate	Sulfate	**Total Secondary**
Total Agriculture	0.84	0.00	0.00	**0.84**	0.39	0.00	0.00	**0.39**
Biogenics - Vegetation and Soil	0.00	0.30	0.00	**0.30**	0.00	0.36	0.00	**0.36**
Commercial Cooking	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Total Fires	0.00	0.00	0.08	**0.09**	0.00	0.00	0.05	**0.06**
Total Fuel Comb - Comm/Institutional	0.00	0.04	0.16	**0.20**	0.00	0.05	0.10	**0.15**
Total Fuel Comb - Electric Generation	0.01	0.04	0.05	**0.10**	0.01	0.05	0.03	**0.08**
Total Fuel Comb - Industrial Boilers, ICEs	0.00	0.06	1.54	**1.60**	0.00	0.07	0.99	**1.05**
Total Fuel Comb - Residential	0.00	0.01	0.01	**0.03**	0.00	0.02	0.01	**0.03**
Total Industrial Processes	0.01	0.04	0.32	**0.37**	0.00	0.05	0.21	**0.26**
Miscellaneous Non-Industrial NEC	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Mobile - Aircraft	0.00	0.00	0.01	**0.01**	0.00	0.00	0.01	**0.01**
Mobile - Locomotives	0.00	0.38	0.18	**0.56**	0.00	0.46	0.11	**0.57**
Total Mobile - Non-Road	0.00	0.37	0.38	**0.76**	0.00	0.45	0.25	**0.69**
Total Mobile - On-Road	0.03	2.35	0.98	**3.36**	0.01	2.82	0.63	**3.46**
Solvent - Industrial Surface Coating & Solvent Use	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Waste Disposal	0.01	0.05	0.07	**0.14**	0.01	0.07	0.05	**0.12**

3.0 CONTROL MEASURE ANALYSIS FOR SIGNIFICANT SOURCES

3.1 Review of Existing Measures

As a first step to selecting control strategies for significant sources, ADEQ reviewed existing control measures as of 2008 to determine which could be considered for strengthening and where the addition of new measures were necessary. A 2005 construction rule and a 2004 fugitive dust rule that apply to numerous significant emitting activities were in place in 2008 (see Table 3). Agriculture Operations (Croplands) and Confined Animal Feeding Operations (CAFOs) were also determined to be a significant contributor to exceedances of the NAAQS. The Agricultural Best Management Practices (BMP) rules at AAC R18-2-Article 6 did not contain measures applicable to the West Pinal area in 2008.

Strengthening of the existing construction and fugitive dust rules and revision of the existing State agriculture rules to include RACM provisions for the West Pinal Nonattainment Area were determined necessary.

Table 3: Control Programs Applicable to PM10 Sources in the West Pinal PM10 Planning Area (as of 2008)				
Regulation Number/ Program Name	Description	Applicable to Source Category	Applicable SIP (Citation)	Last Revised
Pinal County Code of Regulations Chapter 4. Emissions from Existing and New Non-Point Sources; Article 2. Fugitive Dust				
4-2-020. General	Statement of purpose to reasonably regulate operations which periodically may cause fugitive dust emissions into the atmosphere. Applicable in Pinal County.	Residential/Commercial Construction, Land Clearing, and Earthmoving Activities; Open Areas and Vacant Lots; Parking Areas; Agricultural Operations; Material Storage, Transport, and Handling; Paved Roads; Commercial Feedlots or Livestock Areas	75 FR 17307; 04/06/2010	12/04/2002
4-2-030. Definitions	Definitions.		75 FR 17307; 04/06/2010	12/04/2002
4-2-040. Standards	Requires reasonable precautions to prevent fugitive dust from becoming airborne for activities such as: construction; earthmoving; vehicular traffic on vacant lots and open areas; parking areas, agricultural practices; land clearing; material handling, transport, and storage; paved road track out; commercial livestock area activities; road and alley construction or repair; and construction of mineral tailing piles.		72 FR 41896; 08/01/2007	10/27/2004 (06/29/1993 version in SIP)
4-2-050. Monitoring and Records	Sources subject to §4-2-040. are subject to the visible opacity limitations in Chapter 2, Article 8 [20%] as determined by opacity observations conducted in accordance with techniques specified in Reference Method 9 in the Arizona Testing Manual for Air Pollutant Emissions.		72 FR 41896; 08/01/2007	10/27/2004 (05/14/1997)

Table 3: Control Programs Applicable to PM10 Sources in the West Pinal PM10 Planning Area (as of 2008)				
Regulation Number/ Program Name	Description	Applicable to Source Category	Applicable SIP (Citation)	Last Revised
Pinal County Code of Regulations Chapter 4. Emissions from Existing and New Non-Point Sources; Article 3. Construction Sites - Fugitive Dust				
4-3-060. General Provisions	Statement of intent, applicability, and exceptions. Applicable throughout Pinal County for "affected activities" if the disturbed surface area is greater than 0. 1 acre. Includes exception for facilities operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480.	Residential/Commercial/ Roadway Construction		12/4/2002
4-3-070. Definitions	Definitions (includes specified control measures and work practices).			10/27/2004
4-3-080. Registration Requirements	Requires registration, description of planned activity, explanation of mitigation measures and evidence of implementation. Allows annual "Block Registration" for selected activities. Projects greater than or equal to five acres require onsite posting of contact information for public dust complaints.			12/21/2005
4-3-090. Universal Performance Standards	Requires the opacity of dust leaving the property not to exceed twenty percent (20%) as measured using Test Method 9 (40 CFR 60, Appendix A) or approved equivalent method. Authorizes Control Officer to order a cessation for noncompliant activities. Violators may be subject to an order of abatement, a civil action for injunctive relief or civil penalties, or may be found guilty of a Class I Misdemeanor. Includes exception for wind event provided all required measures were in place.			10/27/2004

Table 3: Control Programs Applicable to PM10 Sources in the West Pinal PM10 Planning Area (as of 2008)				
Regulation Number/ Program Name	Description	Applicable to Source Category	Applicable SIP (Citation)	Last Revised
Pinal County Code of Regulations Chapter 4. Emissions from Existing and New Non-Point Sources; Article 6. Restrictions on Vehicle Parking and Use on Vacant Lots				
4-6-200. Unpaved and Disturbed Vacant Lots, Restriction on Vehicle Parking and Use; Applicability	Rule is applicable only in the "Area A"[35] portion of the West Pinal PM_{10} Planning Area. Property subject to the rule includes any unpaved or disturbed vacant lot.	Vacant Lots		9/10/2008
4-6-210. Control Requirements	Contains provisions for restricting vehicle parking and use on distubed vacant lots.			9/10/2008

[35] "Area A" is defined at A.R.S. § 49-541.

3.2 Identification of Available Measures

3.2.1 Initial List of Available Control Measures

Appendix C1 to the *General Preamble* for the Implementation of Title I of the Clean Air Act lists 15 specific available Fugitive Dust control measures that are required to be considered in any RACM analysis.[36] These measures, together with the relevant West Pinal significant source categories are listed in Table 4. Measures identified in Appendices *C2 – Residential Wood Combustion* and *C3 – Prescribed Burning* of the *General Preamble* are not applicable to any significant source categories in the West Pinal PM_{10} planning area and are, therefore, not included in the discussion below. Similarly, measures and analyses recommended in *Appendix C4 – RACT Determinations for Stationary Sources* are not applicable to any significant sources. No major point sources of PM_{10} are located in any of the modeling domains. Of the three major sources in the Nonattainment Area (outside the individual modeling domains), all are natural gas fired power plants with inherently low PM_{10} emissions. Two of the facilities hold Prevention of Significant Deterioration (PSD) permits with Best Available Control Technology (BACT) determinations that list "good combustion practices."

Table 4: Fugitive Dust Control Measures Required To Be Considered

Control Measure	Applicable to West Pinal Significant Land Use/Source Category
1. Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.	Paved Roads.
2. Require dust control plans for construction or land clearing projects.	Construction and Agricultural Operations.
3. Require haul trucks to be covered.	Paved Roads, Construction, and Agricultural Operations.
4. Provide for traffic rerouting or rapid cleanup of temporary (and not readily preventable) sources of dust on paved roads (water erosion, runoff, mud/dirt carryout areas, material spills, skid control sand). Delineate who is responsible for cleanup.	Paved Roads.
5. Require paving, chemically stabilizing, or otherwise stabilizing permanent unpaved haul roads, and parking or staging areas at commercial, municipal, or industrial facilities.	Construction, Agricultural Operations, Developed Urban, Developed Rural, Cleared Areas, Unpaved Parking Lots, and CAFOs.
6. Develop traffic reduction plans for unpaved roads. Use of speed bumps, low speed limits, etc., to encourage use of other (paved) roads.	Unpaved Roads.
7. Limit use of recreational vehicles on open land (e.g., confine operations to specific areas, require use permits, outright ban).	Desert Shrublands, Cleared Areas, Developed Urban, Developed Rural. (includes the insignificant "Trails" portion under the Unpaved Roads category)
8. Require improved material specification for and reduction of usage of skid control sand or salt (e.g., require use of coarse, nonfriable material during snow and ice season).	Not applicable to any significant source.

[36] *State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990; Supplemental*, 57 FR 18070-18077, April 28, 1992.

Table 4: Fugitive Dust Control Measures Required To Be Considered	
Control Measure	Applicable to West Pinal Significant Land Use/Source Category
9. Require curbing and pave or stabilize (chemically or with vegetation) shoulders of paved roads.	Paved Roads.
10. Pave or chemically stabilize unpaved roads.	Unpaved Roads.
11. Pave, vegetate, or chemically stabilize unpaved parking areas.	Construction Sites, Agricultural Operations, Cleared Areas, Developed Urban, Developed Rural, and Unpaved Parking Lots.
12. Establish dust control measures for material storage piles.	Construction.
13. Provide for storm water drainage to prevent water erosion onto paved roads.	Paved Roads.
14. Require vegetation, chemical stabilization, or other abatement of wind erodible soil, including lands subjected to water mining, abandoned farms, and abandoned construction sites.	Cleared Areas.
15. Rely upon the soil conservation requirements (e.g., conservation plans, conservation reserve) of the Food Security Act to reduce emissions from agricultural operations.	Agricultural Operations.

3.2.2 Measures Adopted in Other Areas

Although few PM_{10} moderate area plans containing RACM measures were developed in the early 1990s after the enactment of the 1990 CAA amendments, one resource of available measures is a 1999 Federal Implementation Plan (FIP) in which EPA promulgated RACM for several fugitive dust source categories in the Phoenix, Arizona PM_{10} planning area.

There were, however, several serious area plans containing BACM measures that were submitted to and approved by EPA. Many of these plans were developed by jurisdictions in the Pacific Southwest, including those listed below.

- San Joaquin Valley Air Pollution Control District (SJVAPCD), California
- Great Basin Unified Air Pollution Control District (GBUAPCD), California
- South Coast Air Quality Management District (SCAQMD), California
- Coachella Valley, California (Part of the SCAQMD)
- Mojave Desert Air Quality Management District (MDAQMD), California
- Imperial County Air Pollution Control District (ICAPCD), California
- Clark County Department of Air Quality, Nevada
- Maricopa County Air Quality Department, Arizona

PM_{10} emissions control rules developed by these areas were reviewed, summarized, and grouped by source category for use in assessing commonalities and differences in control approach.[37] These results were used as the starting point for first identifying appropriate measures applicable to significant PM_{10} sources in Western Pinal County and then, in the case of available BACM, formulating corresponding RACM measures using the relationships between BACM and RACM as defined in EPA guidance. BACM and RACM strategies relevant to the West Pinal PM_{10} Nonattainment Area are summarized in Exhibit 1and discussed in Section 3.2.3 below.

3.2.3 Discussion of Candidate Measures

Paved Roads (Public, Private)

Several measures applicable to paved roads are listed in Appendix C1 of the General Preamble. These measures, primarily designed to reduce silt loading, include undefined requirements for prevention and cleanup of trackout and water erosion runoff from unpaved surfaces onto paved roads and stabilization of road shoulders or installation of curbing, as well as provisions for storm water drainage to prevent erosion onto paved roads.

Available BACM measures incorporate the listed preamble measures with the addition, in some cases, of street sweeping and reduced speed limits. Most BACM include de minimis daily traffic levels below which controls are not required or restrict applicability to certain higher impact areas. For example, road shoulder paving or stabilization measures are based on road type and usage. Minimum paved or stabilized shoulder width requirements may range from 2 to 8 feet depending on average daily vehicle trips. The width requirements may also vary depending on type of road: arterial, collector, local, etc. Measures for PM_{10} efficient street sweepers might only be applicable to urban areas.

After consideration of available measures relevant to paved roads and the needs of the West Pinal area, potential RACM measures might include the following:

- Pave or stabilize (chemically or with vegetation) shoulders of paved roads or install curbing;
- Ensure stabilization during weed abatement/vegetation management on unpaved shoulders of paved roads;
- Stabilize medians;
- Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads;
- Rapid clean up of sources of dust on paved roads (water erosion runoff, mud/dirt carryout areas, material spills);
- Provide for storm water drainage to prevent water erosion onto paved roads;
- Employ street sweepers; and
- Reduce speed limits.

Unpaved Roads (Public, Private, Agricultural)

[37] The results of this effort are contained in *Control Measures Applicable to the West Pinal County PM_{10} Nonattainment Area Significant Sources*, February 20, 2015. Because of its large size it is not included in this document but is available upon request.

Unpaved Roads (Public, Private[38])

Several RACM measures are available for unpaved roads including paving or other stabilization and reduced usage and speed limits. RACM guidance published by EPA requires that traffic reduction plans and paving or chemical stabilization be evaluated for unpaved road control. Traffic reduction plans can be effective in areas of dense roadway networks, where the traveling public is not significantly inconvenienced by having to use alternative paved roads in place of unpaved roads. In the rural portions of the West Pinal County PM_{10} nonattainment area, however, this measure will not be feasible because of the substantial increases in route lengths that would have to be driven through the selective closure of unpaved roads. The use of paving or chemical stabilization for unpaved road emission control is addressed by the requirements of the model RACM measure offered in this analysis. In the Phoenix area RACM FIP control strategies are applicable only to unpaved roads open to public access and owned or operated by governmental or quasi-governmental agencies with average daily trips of 250 vehicles or greater.

BACM measures applicable to unpaved roads to which the public has access generally include emission limits framed in units of plume opacity and requirements for road owners to use acceptable surface treatments from lists included in regulations. Several measures require local governments to treat increasing fractions of unpaved roads under government ownership or control over a period of years commencing with rule adoption dates. This staging of control implementation is intended to recognize expenditure limitations imposed on some local governments. Most BACM measures also include de minimis daily traffic levels below which controls are not required.

The typical plume opacity limit allowed for vehicle travel over unpaved roads is 20% in reviewed RACM and BACM. Some BACM measures further include a surface silt loading limit of 0.33 oz/ft^2. Because of the commonality of the opacity limit among RACM and BACM measures, this limit of 20% should be given consideration for inclusion in a RACM measure for the Western Pinal County nonattainment area.

As noted above, many BACM measures for public unpaved roads include a schedule for treating or paving increasing or fixed fractions of the total miles of unpaved roads within the nonattainment area or within a jurisdiction's boundaries. Some BACM measures contain fixed schedules (e.g., conversion to asphalt concrete pavement of 10% of original unpaved road inventory annually), while others allow the affected jurisdiction to propose a schedule with economic justification for consideration by the regulatory agency.

Under most BACM, low traffic volume roads are exempted from controls on the basis of cost-effectiveness considerations. The traffic volume thresholds for control range from 26 to 150 vehicles per day, with a mode of 50 vehicles per day. The threshold in the one reviewed RACM measure was 250 vehicles per day.

Based on the analysis of RACM and BACM measures applicable to public unpaved roads, control strategies for the West Pinal areamay include, as one option, the requirements outlined below:

- Exempt from controls on the basis of de minimis emissions public unpaved roads that experience 250 or fewer vehicles per day;
- Limit visible opacity to 20% for emission plumes from vehicle travel on unpaved roads subject to control requirements;

[38] In this context, "Private" does not include unpaved agricultural, irrigation district, or construction roads. These sources are included under the construction and agricultural categories.

- Limit controls to those typically listed in BACM measures with the option to propose new controls upon review and approval of the Pinal County Air Quality Control District (PCAQCD);
- Require local governments maintaining public road networks within the PM_{10} nonattainment area to submit plans and schedules for applying stabilization measures to increasing fractions of non-exempt unpaved roads, for review and action by the PCAQCD;
- Develop traffic reduction plans to encourage use of paved roads (non-rural areas); and
- Require speed restrictions.

Unpaved Roads (Agriculture)

Arizona Revised Statutes (ARS) §49-457 authorizes control of PM_{10} emissions from agricultural sources including crop and animal operations and irrigation districts.[39] As currently enacted, the statute requires each owner/operator of an agricultural operation required to have an agricultural PM_{10} general permit to implement at least one Best Management Practice (BMP) for each emitting activity in a moderate PM_{10} nonattainment area. This program requires adoption of BMPs for agricultural and irrigation district road PM_{10} emission control.

New agricultural rules for the West Pinal County Nonattainment Area could include the following measures:

- Pave or stabilize unpaved roads, access connections, and high traffic areas;
- Limit vehicle access to unpaved roads, access connections, and high traffic areas; and
- Reduce vehicle speed.

Unpaved Parking Lots

Discussion of measures for unpaved parking lots is included under Developed Lands – Urban and Developed Lands – Rural.

Construction (Residential Construction, Commercial Construction, Site Development)

Construction sites were determined to be a significant source category only on high-wind design days. Therefore, analysis of RACM for construction sites in Western Pinal County focused on measures that reduce emissions from disturbed soil surfaces during high wind conditions such as disturbed surface stabilization. There may also be some co-benefit of measures designed primarily to reduce emissions on low-wind days such as speed limits for vehicles traveling on unpaved surfaces, covering haul truck (tarping), and unpaved-to-paved road track-out cleanup. Therefore, low-wind measures were also included in the review of existing rules.

BACM control measures adopted by PM_{10} serious nonattainment areas typically require specific work practices to be performed to control emissions during high wind conditions. This is due primarily to the present lack of cost-effective temporary solutions to effectively control windblown PM_{10} emissions under the range of wind speeds experienced in areas like Western Pinal County from soil surfaces continuously disturbed during bare-land construction activities. Emission limits in rules applicable to construction sites are usually suspended by regulatory exemption when average hourly wind speeds exceed thresholds of 15

[39] Irrigation district includes unpaved operation and maintenance roads, canals, and utility access roads.

to 25 mph. Preventive or remedial work practices are specified in several rules in advance of or during high wind conditions. Work practices applicable to these sources include the application of water or dust palliatives, and the installation of wind fencing or vegetative barriers to reduce emissions from disturbed soil areas; and the surface application of water or dust palliatives, tarping, or the construction of wind shelters or enclosures to control emissions from fine material storage piles. Many construction control rules also require the shutdown of earthmoving and other soil-disturbance activities whenever the specified threshold wind speed is exceeded.

Several, but not all, adopted BACM measures for large construction sites require the development and approval of dust control plans prior to commencement of construction. Such plans typically are required to address PM_{10} emissions from each phase of construction, including periods of high wind conditions. Plans developed under these rules are site-specific and may include innovative techniques for controlling windblown PM_{10} that are typically pre-negotiated with the regulatory agency before plans are submitted for evaluation and approval. Such control techniques, however, are required to be equivalent in control effectiveness to applicable BACM measures listed in construction control rules.

EPA PM_{10} SIP guidance requires that dust control plans be evaluated as a candidate RACM if construction or land clearing activities are significant sources. The guidance assumes that construction PM_{10} emissions are significant in the absence of high wind conditions. Because construction emissions are significant in Western Pinal County only during high wind conditions, a substantial portion of benefits anticipated by the U.S. EPA in drafting this guidance will not be realized here. The remaining portions of dust control plans that address high wind PM_{10} emissions from disturbed soil surfaces are addressed by the BACM measures reviewed in this analysis. As a result, RACM strategies extrapolated from these BACM measures will satisfy requirements of the U.S. EPA guidance.

Based on the analysis of BACM measures applicable to construction sites, a RACM measure derived from applicable BACM regulations may include, as one option, the requirements outlined below:

- Cease soil disturbance activities whenever hourly average wind speeds exceed a specified mph threshold as indicated by dust plume opacities exceeding 20% on a three-minute average basis,
- Apply water to disturbed soil and fine material storage pile surfaces during work hours whenever peak hourly average wind speeds exceed a given threshold,
- Apply water to disturbed soil and fine material storage pile surfaces at the end of a work day whenever high wind speeds are forecast by PCAQCD to occur prior to construction resuming either the following day or the next scheduled work day,
- Exempt construction sites of less than 0.5 acres total disturbed area from control requirements,
- Control spillage and cover haul vehicles, and
- Restrict site access or limit vehicle speeds.

Cleared Areas

Cleared areas were found through air quality modeling to be a significant source category on high wind days in Western Pinal County. These are areas from which vegetation has been removed and the land leveled in preparation for construction, agricultural cultivation, or other future purpose, but which are not currently in active use. BACM measures applicable to these areas are primarily designed to control the emissions from high wind entrainment of loose surface soil particles.

Adopted BACM measures in serious area PM_{10} plans applicable to cleared areas primarily focus on mitigation and, to a lesser extent, prevention of additional soil disturbance activities at such sites. These

rules typically require the use of one or more listed work practices to achieve stabilized soil specifications and to limit visible plumes generated during high wind conditions to 20% opacity. The work practices listed in a number of these BACM rules include water application, application of dust palliatives, establishment of protective vegetation, or the application of a gravel blanket or asphalt concrete pavement to protect exposed soils. Stabilized soil specifications in BACM measures commonly specify crust strength as measured by a simple field test, surface soil texture as measured by a hand sieving protocol, or horizontal or vertical vegetation coverage fractions as measured by visual estimation. Prevention measures, which are typically required only when illegal vehicle trespass is observable and continuous, include the installation of "No Trespassing" signage and/or barriers to block vehicle access. Applicability thresholds in reviewed BACM generally range from 0.1 to 3.0 acres. An available RACM measure provides a 5,000 square foot threshold only for disturbance by motor vehicle traffic.[40]

Based on the analysis of measures applicable to cleared areas, a RACM measure would include, as one option, the following requirements:

- Exempt from controls, on the basis of de minimis emissions, parcels within areas zoned for residential or commercial development that contain less than 0.5 acres of disturbed soils and parcels under other zoning designations that contain less than 3.0 acres of disturbed soils;
- Install "No Trespassing" signs at the vehicle entry points to areas containing more than 0.1 acre of surface area disturbed by motor vehicle trespass;
- Establish ground cover vegetation sufficient to stabilize;
- Restore to a natural state;
- Apply dust suppressants; and
- Apply surface gravel.

Developed Lands - Urban

Developed urban lands were determined through air quality modeling to be a significant source contributing to exceedances of the 24-hour PM_{10} standard during high wind conditions at the Maricopa monitoring site. Developed urban lands are parcels hosting urban development at densities and with amenities that result in almost 100% soil coverage with structures, asphalt concrete or Portland concrete pavement, and landscaping vegetation. Rergardless, the average portions of these properties that are comprised of open, disturbed soils were estimated by PCAQCD to be 5%.[41]

The disturbed portions of developed urban land typically include smaller cleared areas (including vacant lots), dedicated unpaved parking and traffic areas, and open areas subject to disturbance (i.e. motorized vehicle traffic). Because of the suggested exemption threshold for cleared areas, cleared-area RACM applied in developed urban areas may not be as cost-effective for the control of windblown PM_{10} when applied to areas estimated to be as small as 0.008 acres[42] on individual parcels of developed urban land. RACM for developed urban land may include:

- Limit vehicle access,
- Establish ground cover vegetation sufficient to stabilize,
- Restore to a natural state,

[40] Five thousand (5,000) square feet is approximately equal to 0.11 acres. For certain comparisons, however, the value is rounded to 0.1 acres.
[41] Email communication from Don Gabrielson, Pinal County AQCD, to Bob Dulla, Sierra Research, dated May 23, 2013.
[42] Based on a smaller urban parcel size of 7,260 ft^2 (1/6th acre). Sierra Research 2014.

- Apply dust suppressants,
- Apply surface gravel, and
- Pave.

Developed Lands - Rural

Developed rural lands were also determined to be a significant source impacting the Maricopa monitoring station on high wind days. Developed rural lands are parcels primarily hosting single-family residences on larger land areas, ranging from 1 to 15 acres. Land coverage fractions on these parcels are small and have substantial portions of exposed soils, at least a portion of which are typically disturbed and susceptible to wind erosion during high wind conditions. Similar to developed urban land, the disturbed portions of developed rural areas typically include smaller cleared areas, unpaved parking areas, and open areas subject to other disturbance.

Disturbed open areas are required under BACM rules to have soil surfaces sufficiently stabilized to prevent windblown plume opacities from exceeding 20%. Because developed rural lands may contain disturbed areas greater than the suggested cleared area de minimis threshold, soil stabilization requirements could be applied to developed rural lands as a BACM measure. While the cost-effectiveness of soil stabilization may be reasonable on these lands, the ability of property owners to satisfy such requirements would be challenging.
On the basis of this analysis, a RACM measure applicable to developed rural lands would include, as one option, the following requirement:

- Limit vehicle access,
- Establish ground cover vegetation sufficient to stabilize,
- Restore to a natural state,
- Apply dust suppressants,
- Apply surface gravel,
- Pave.

Desert Shrublands

Desert shrublands are those undeveloped lands in Western Pinal County that are owned by public or private entities and that mostly have not been previously disturbed from a natural state. Desert shrublands were found through air quality modeling to be a significant source category on high wind design days at each of the four analyzed monitoring stations recording exceedances of the 24-hour standard in 2008. The sources of PM_{10} emissions from these lands are the emissive soil areas disturbed by off-road or off-highway recreational vehicle (OHV) traffic and limited livestock grazing (only relevant to the degree to which overgrazing may occur). Grazing leases issued by the Arizona State Land Department (ASLD) are based on the carrying capacity of the land parcel that is leased. The lessee cannot exceed the established carrying capacity and is responsible to repair any damage caused by his/her livestock. In the interest of the lessees own grazing operation the lessee can, with ASLD approval, make range improvements to the leased allotment for future grazing seasons.

Applicable rules generally require minimizing soil disturbance by limiting operations of off-road recreational vehicles to specific areas. Some rules require vehicle owners to first obtain authorization from public land managers or consent from private owners. One area requires a dust control plan for

activity on public land. Some areas operated by land managers (ASLD) have been closed to OHV traffic due to overuse.

Based on the analysis of measures applicable to desert shrublands, a RACM measure derived from adopted BACM rules would include, as one option, the following requirement:

- Require vehicles operating on either undeveloped public or private properties to remain on maintained roads or comply as specified with the following: on public property, obtain lawful authority; and on private property, obtain the consent of the owner.

Agricultural Operations (Croplands)

Agricultural operations occupy a considerable portion of the Western Pinal County PM_{10} nonattainment area. Air quality modeling found that these operations qualified as significant sources on both low wind and high wind days. As a result, BACM measures that control PM_{10} emissions during both stagnation and high wind days were considered in this analysis.

BACM rules applicable to agricultural operations have been developed by only a few serious PM10 nonattainment areas where agricultural operations constitute significant portions of the local economy and the PM10 emission inventory. The regions in which the most work has been done to identify emissions characteristics of individual activities and to evaluate the effectiveness and feasibility of alternative control approaches have been San Joaquin Valley and Imperial County in California and Maricopa County in Arizona. For that reason, the analysis of agricultural operation BACM measures was focused on these three programs. In each program, owners or operators of agricultural operations are required to implement Best Management Practices (BMPs) to control PM_{10} emissions from each dust-generating activity conducted on agricultural parcels. Under Arizona state law, owner/operators in the Maricopa County serious area are required to implement two BMPs for each affected activity. BMPs are detailed and compiled into handbooks in each jurisdiction, and are periodically updated to reflect the findings of new research. Both of these programs also require each owner/operator of an operation exceeding 40 to 100 acres in size to develop and submit for approval a dust control plan identifying each BMP commitment for each affected activity.

Based on the analysis of BACM measures applicable to agricultural operations, a RACM measure derived from adopted BACM rules would include, as one option, the following requirements:

- Exempt from controls, on the basis of de minimis emissions, agricultural operations on parcels of 100 acres or less that are 1.0 mile or greater from any zoned residential area;
- Implement one BMP each to control emissions from agricultural activities that collectively produce 50% of annual PM_{10} emissions from an individual commercial agricultural operation; and
- Develop a BMP plan for each affected agricultural operation.

Confined Animal Feeding Operations (CAFOs)

Confined animal feeding operations (CAFO) are facilities in which animals bred for human consumption are fattened prior to transport to meatpacking facilities. CAFOs in Western Pinal County are used primarily to fatten beef cattle for market. Air quality modeling determined that CAFOs were a significant source of PM_{10} emissions on both stagnation and high wind design days.

BACM regulations specific to CAFOs have been adopted in those serious PM_{10} nonattainment areas where agricultural operations are significant in terms of the local economy and PM_{10} emissions. The most extensive work in controlling PM_{10} emissions from CAFOs has been done in San Joaquin Valley, Imperial County, and in Maricopa County. In these jurisdictions, CAFO regulations are designed to parallel those applicable to agricultural operations, requiring the development and submittal of BMP plans and commitment to at least one listed BMP for each PM_{10} emission activity occurring within a CAFO. In two of the applicable regulations, CAFO owner/operators are also required to submit annual emission inventories for their facilities and apply for and maintain industrial source operating permits. These two regulations also contain specific requirements for the management of manure, both within livestock pens and after removal.

Based on the analysis of BACM measures applicable to CAFOs in San Joaquin Valley, Imperial County, and in Maricopa County, a RACM measure derived from adopted BACM rules would include, as one option, the following requirement:

- Develop and implement PM_{10} control plans addressing all PM_{10} emission sources designed to reduce facility-wide PM_{10} emissions by 50% on a per-head basis from a 2016 baseline within each affected facility.

3.2.4 Stakeholder Process

ADEQ and the Pinal County Air Quality Control District worked with their partners to analyze emissions and develop control strategies for the West Pinal PM_{10} Nonattainment Area. Participation was 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 rulemakings (construction and fugitive dust rules). Participating entities include those listed below.

Arizona Governor's Agricultural Best Management Practices Committee
The best management practices committee was established under A.R.S. § 49-457 to develop an agricultural general permit specifying best management practices to reduce PM_{10} emissions from regulated agricultural activities. The fifteen member committee currently consists of representatives from: ADEQ, Arizona Department of Agriculture, University of Arizona College of Agriculture (2), U.S. Natural Resources Conservation Service, Pinal County Air Quality Control District, and members engaged in the cotton, vegetable, grain, alfalfa, citrus, poultry, beef cattle, swine, and dairy industries.

Arizona Chapter, Associated General Contractors (The Associated General Contractors of America)
The Associated General Contractors is an association of general contractors, subcontractors, and other construction industry affiliated firms engaged in highway, heavy, industrial and municipal-utility construction.

Home Builders Association of Central Arizona
The Home Builders Association of Central Arizona is a trade association for the residential construction and development industry.

Maricopa Association of Governments
The Maricopa Association of Governments is the regional air quality planning agency (ozone, carbon monoxide, particulate matter) and metropolitan planning organization for transportation planning for all

jurisdictions in Maricopa County and the contiguous urbanized area in Pinal County (a member agency), including the Town of Florence, City of Maricopa, and the City of Apache Junction.

Sun Corridor Metropolitan Planning Organization
The Sun Corridor Metropolitan Planning Organization provides transportation planning services to the communities of Casa Grande, Coolidge, Eloy and rural portions of Pinal County.

Pinal County Public Works Department
The Pinal County Public Works Department provides, among other services, transportation infrastructure, engineering, flood control, and emergency management services. The County storm water management program includes management of flooding and erosion control.

Bureau of Land Management - Arizona
The Bureau of Land Management administers public lands under its jurisdiction within the state providing field management for areas that include recreational, commercial, scientific and cultural interests.

Arizona State Land Department
The Arizona State Land Department manages lands that are the subject of a public Trust created to support public schools and education in the State. The Trust accomplishes this goal in a number of ways, including the sale and lease of Trust lands for grazing, agriculture, municipal, residential, commercial and open space purposes.

Arizona Game and Fish Department
The Arizona Game and Fish Department manages wildlife resources, regulates watercraft use, and enforces off-highway vehicle laws. The Department works in cooperation with sovereign tribes, local governments, and private land owners.

Municipalities (e.g., City of Maricopa, City of Casa Grande)

Arizona Department of Transportation
The Arizona Department of Transportation is the agency responsible for planning, building, and operating the State highway system and bridges.

Indian Communities (e.g., Gila River Indian Community, Ak-Chin Indian Community)

United States Environmental Protection Agency

Other Members of the Regulated Community

Members of the Public

4.0 SELECTED MEASURES

Reasonably available control measures for the West Pinal PM_{10} Nonattainment Area are encompassed in three rulemakings: one for construction sources, one for agricultural sources, and one for general fugitive dust sources. Sections 4.1 through 4.3 present these rules and provide discussion and comparison to control strategies adopted in other planning areas in the pacific southwest. The listed measures achieve emissions reductions sufficient to demonstrate attainment by the December 2018 deadline as well as meet contingency plan goals.

In this analysis, measures are considered technologically feasible if the relevant control is currently available and implemented elsewhere, shown to be enforceable and practicable in the West Pinal planning area, and achieves emissions reductions prior to the December 2018 attainment date.[43] Because a violation of the standard is a calculated 3-year average, emissions reductions from measures relied upon for attainment must generally begin in January 2016. Contingency measures are not required to be implemented unless the area fails to meet RFP goals or attain the NAAQS by the attainment date. ADEQ determined that attainment measures should be selected from rules with the earliest effective date and scheduled to be fully implemented by January 1, 2016. Other measures were determined more appropriate to meet contingency and "weight of evidence" goals, such as those that are incrementally implemented over time (e.g. paving of unpaved roads).

In the process of evaluating the economic feasibility of potential measures, a number of criteria may be considered regarding the cost of reducing emissions, including capital and operational costs, availability of funding and resources, and cost effectiveness measured in dollars per ton of emissions reduced. The General Preamble suggests that in the case of public sector sources and control measures, the cost evaluation should consider the impact on the government entity that must assume responsibility for implementation of those measures.[44] No fixed dollar per ton cost effectiveness threshold was considered for reasonableness in this analysis. Instead, measures were evaluated and justified on a case by case basis considering implementation costs and technical feasibility.

[43] Regarding RACM, EPA "... indicated that where measures that might in fact be available for implementation in the nonattainment area could not be implemented on a schedule that would advance the date for attainment in the area, EPA would not consider it reasonable to require implementation of such measures." 57 FR 13560, April 16, 1992.

[44] See 63 FR 15932, April 1, 1998.

4.1 Construction

4.1.1 Measure Title(s)

Pinal County Air Quality Control District (PCAQCD) Code of Regulations, Chapter 4, Article 3, Construction Sites – Fugitive Dust

Arizona Revised Statutes (ARS) § 49-424(11) (Authorizing and implementing statute for high risk forecast)

4.1.2 Copy of Ordinance, Rule or Regulation

See Appendix G, Exhibit G-VII for the Notice of Final Rulemaking as published in the Arizona Administrative Register.

4.1.3 Implementation Schedule

The effective date of the rule is January 1, 2016; measures will be fully implemented after this date.

4.1.4 Basis for Consideration

In Appendix C1 of the General Preamble, EPA identified these measures for control of PM_{10} under the category Available Fugitive Dust Control Measures (see Table 4, Section 3.2.1).

Also considered were several rules adopted in the pacific southwest including: Imperial County Air Pollution Control District Regulation VIII, Rule 800 General Requirements for Control of Fine Particulate Matter (PM-10), Rule 801 Construction and Earthmoving Activities, Rule 802 Bulk Materials, Rule 803 Carry-out and Track-out, Rule 805 Paved and Unpaved Roads, Rule 806 Conservation Management Practices; Maricopa County Rule 310, Fugitive Dust from Dust-Generating Operations; San Joaquin Rule 8010 Fugitive Dust Administrative Requirements For Control Of Fine Particulate Matter (PM10), Rule 8020 Fugitive Dust Requirements For Control Of Fine Particulate Matter (PM10) From Construction, Demolition, Excavation And Extraction Activities, Rule 8021 Construction, Demolition, Excavation, Extraction, And Other Earthmoving Activities; and South Coast Rule 403 Fugitive Dust.

4.1.5 Applicable to the Following Land Use Categories and Emission Generating Activities

The construction rule contains emissions reduction strategies for windblown and activity-based emissions from:

- Construction (Residential, Commercial, Site Development, Roadway).

The rule also provides benefit for reducing paved road emissions by reducing airborn deposition and trackout.

4.1.6 Discussion of Measure Benefits

Construction activity was found to be a significant source on high-wind days. The new construction rule replaces and strengthens the existing construction rule in the West Pinal Planning Area and will reduce emissions from this source category under both high-wind and low-wind design day conditions.

The contingency measure obligation for the nonattainment area is 7,475.4 tons per year (tpy), implementable by 2018, if needed.[45] The measures which satisfy this requirement will be implemented proactively, starting on January 1, 2016. The new strategies contained in the construction rule help meet contingency goals by reducing PM_{10} emissions by at least 4,686.6 tons per year in 2018 (see Table 5).

Table 5: Estimated Annual Emissions Reductions due to Construction Rule Implementation		
Control Strategy	Emission Reduction Credit	Reduction (tpy)
Construction (Residential, Commercial, Site Development, Roadway)	Contingency	4,686.6
Trackout	Contingency	< 5.0[46]
Total		≈ 4,691.6

4.1.7 Discussion of Technical and Economic Considerations

Table 6 lists the technical feasibility and cost standings of available measures appropriate to construction, earthmoving, and related activities. The table is followed by a brief discussion of the feasibility of the West Pinal control strategy.

Table 6: Construction and Earthmoving*			
Measure	Technically Feasible	Reasonable Implementation Cost	Construction Rule Measure
1. Pave or stabilize [trackout control device] access points where unpaved traffic surfaces adjoin paved roads.	Y	Y	Y
2. Require dust control plans for construction or land clearing projects.	Y	Y	Y
3. Require haul trucks to be covered.	Y	Y	Y
4. Provide for traffic rerouting or rapid clean-up of temporary sources of dust on paved roads (water erosion, runoff, mud/dirt track out, material spills).	Y	Y	Y
5. Develop traffic reduction plans for unpaved roads. Use of speed bumps, low speed limits, etc., to encourage use of other (paved) roads.	Y	Y	Y
6. Stabilize unpaved parking and traffic areas [haul/access roads].	Y	Y	Y
7. Establish dust control measures for material handling and storage.	Y	Y	Y
8. Limit trespass in open areas and vacant lots [work site].	Y	Y	Y
9. Require stabilization or other abatement of wind erodible soil.	Y	Y	Y

* Y = yes; N = no; P = partial (portions of available measure were found to be feasible); NA = not available or not applicable; NE = not evaluated.

[45] See Section D5.2 of Appendix D to this SIP submittal, "Pinal County PM_{10} Nonattainment Area 2018 Attainment Demonstration and Controlled Emissions Inventories," ADEQ, 2015.
[46] A 5 ton per year reduction is collectively due to trackout provisions in the Construction and Fugitive Dust rules.

The Construction Rule requires various measures to reduce fugitive emissions from construction and earthmoving activities. In addition to other controls, the rule requires an approved permit and dust control plan prior to the start of activity at work sites of 0.1 acre or more. The new rule revises previously applicable requirements to include: a 20 percent opacity limit for visible emissions *within* the work site (not just at the fenceline); test methods to determine stabilization; inspections and stabilization requirements for the day before and the day that is forecast to be at high risk for dust emissions; and improved record keeping.

ADEQ and the Pinal County Air Quality Control District worked with the Arizona Chapter of the Associated General Contractors and the Home Builders Association of Central Arizona to develop control strategies for construction and earthmoving activities in the West Pinal PM_{10} Nonattainment Area. Participation was encouraged and technical advice sought through meetings and discussion to determine the feasibility of implementing the measures contained in the rule.

According to the final construction rule preamble, there are estimated small incremental costs to the businesses potentially affected by the construction rule.[47] Costs may be accrued for items such as opacity certifications, on-site inspections, recordkeeping, and stabilization requirements.

Regulated community members may incur costs to complete opacity certification in order to comply with §§ 4-3-180(A)(1). Depending on an operation's existing recordkeeping practices, there could be small incremental costs associated with keeping the appropriate records that are required under the rules. The amount of time required for the regulated community to conduct inspections of their respective work sites to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized (every other week for work sites 0.1 acres and larger and on the day leading up to and including the day of high risk forecasts for work sites 5 acres and larger) will add to overall labor costs associated with each construction project. The extent of their specific budgetary impacts, however, is unknown at this time. The stabilization requirements of the rules may also add costs to the regulated community. Although the specific additional costs of the rule have not been fully estimated, some of the impacts on the regulated community will be lessened because rules previously in effect in the West Pinal PM_{10} Nonattainment Area also included opacity requirements as well as similar application and permitting requirements.

Estimated costs for the Pinal County Air Quality Control District (PCAQCD) are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning to determine any needed changes to associated dust and open burning permit fees.

4.1.8 Comparison of the Pinal County Rule with Measures Adopted in Other Areas

Exhibit F-II compares the Pinal County Construction Rule with BACM and RACM strategies adopted and approved for other nonattainment areas in the Pacific Southwest.

[47] See Appendix G, Exhibit G-VII.

4.2 Agriculture

4.2.1 Measure Title(s)

Arizona Administrative Code, Title 18, Chapter 2, Article 6 – Emissions from Existing and New Nonpoint Sources (specifically A.A.C. R18-2-610 & 610.03 for commercial farms and A.A.C. R18-2-611 & 611.03 for commercial animal operations (CAFOs and Dairies), and A.A.C. R18-2-612 & 612.01 for irrigation districts)

4.2.2 Copy of Ordinance, Rule or Regulation

See Exhibit G-VI for the published final rules in the Arizona Administrative Register.

4.2.3 Implementation Schedule

The Arizona Administrative Code Agricultural Rules were effective upon filing with the Arizona Secretary of State, as of July 2, 2015.

The rules must be complied with beginning January 1, 2016. The rules mandate that from and after December 31, 2015, agricultural sources engaged in regulated agricultural activity must complete a BMP Program General Permit Record Form every year by March 31. While this seems to provide an implementation gap, this is not the case. Per the recently revised statute, A.R.S. § 49-457, "[a] person who commences a regulated agricultural activity shall immediately comply with the agricultural general permit [prescribed by the statute]." The statute dictates that whether or not a BMP form is available for an inspector's review, a farmer/operator must still be complying with the BMP program. Additionally, after the program's first year, the farmer will have at the very least the previous year's BMP form on file for review.

4.2.4 Basis for Consideration

ADEQ considered those measures identified in Appendix C1 of the General Preamble to the 1990 Amendments, and also considered RACM measures in other representative areas, including those areas as shown in Section 3.2 above, and Exhibit F-III, attached.

4.2.5 Applicable to the Following Land Use Categories and Emission Generating Activities

Table 7: Agriculture rule applicable sources	
Windblown dust sources	Unpaved Roads (including permanent unpaved haul or access roads, canal roads, unpaved cropland roadways)
	Dairies (including arenas, corrals, and pens, and unpaved roads and feed lanes)
	CAFOs (including arenas, corrals, and pens, and unpaved roads and feed lanes)
	Agriculture (cropland and noncropland)
Activity-based emission sources	Ag Fields - Harvesting and Ground Operations
	Ag Fields - Tilling
	CAFO related activity (including animal waste and feed handling and transportation and activity in arenas, corrals, and pens, and on unpaved roads and feed lanes)
	Activity on unpaved crop roads and canal roads
	Significant Earthmoving Activities
	Dairy operation related activity (including from animal waste and feed handling and transportation and activity in arenas, corrals, and pens and on unpaved roads and feed lanes)

4.2.6 Measure Benefits

The measures chosen were found to have numerous benefits towards reaching attainment and contingency measures by reducing dust from:

- Commercial Farm activity and wind generated dust
- Commerical Animal Operation activity and wind generated dust (note that controls on commercial dairy operations were used for contingency measures)
- Irrigation District activity and wind generated dust

These measures resulted in the benefits demonstrated in Table 8 below.

Table 8: Agricultural Best Management Practices Rule Reductions (Attainment and Contingency)							
ADEQ estimated the following reductions to the 2018 emissions inventory for the NA in tons of PM_{10} per year (TPY).		Attainment				Contingency	*AgBMP Rule Subtotal*
		Unpaved apron roads	Unpaved canal O&M roads	Harvesting and Tilling	CAFOs	Dairies	
Windblown dust	Unpaved Roads	705.2	144.7				*849.9*
	Dairies					65.4	*65.4*
	CAFOs				29.9		*29.9*
	Agriculture			12388.1			*12388.1*
	Subtotal	705.2	144.7	12388.1	29.9	65.4	*13333.3*
Activity-based emissions	Ag Fields - Harvesting			105.8			*105.8*
	Ag Fields - Tilling			882.3			*882.3*
	CAFOs				251.4		*251.4*
	Unpaved Road	7341.3	577.6				*7918.9*
	Dairy					35.8	*35.8*
	Subtotal	7341.3	577.6	988.1	251.4	35.8	*9194.2*
Total		8046.5	722.3	13376.2	281.3	101.2	*22527.5*

4.2.7 Technical and Economic Considerations

ADEQ and the Agricultural Best Management Practices Committee (the "Committee") have intensely deliberated to ensure that the control strategy developed is the best and most cost effective possible to control PM_{10} from agricultural sources in the West Pinal PM_{10} nonattainment area. Throughout the rulemaking process the Agricultural BMP Committee analyzed each BMP and its respective potential cost on the industry. The Committee also analyzed technical ability of industry operators to reasonably implement each BMP. The Committee, in communication and negotiation with its agricultural industry members, has produced a rule it believes is economically and technologically feasible to implement.

PM_{10} agricultural strategies are intensely reliant on a specific locale's climate, soil type, growing season, crop types, water availability, market conditions, and relations to urban centers.[48] A menu option program structure has become standard for agricultural industry PM control, in large part because the feasibility of implementing pollution controls depends on the factors listed above. Agricultural operation diversity dependent on several local and operation specific factors complicate and undermine the establishment strict criteria to control PM. Allowing industry operators to choose from an assortment of specified options enables particulate matter control in spite of the inherent variable nature of agricultural operations

[48] *See Latino Issues Forum v. United States EPA*, 558 F.3d 936, 948 (9th Cir. 2009) ("Due to the variability of weather and market conditions, as well as the diversity among the agricultural operators that fall under [San Joaquin County] Rule 4550, it is reasonable to provide agricultural operators the flexibility to choose whichever methods of PM-10 reduction will be feasible for their individual properties."); *Proposed Approval and Promulgation of Implementation Plans; Arizona – Maricopa Nonattainment Area; PM10*, 63 FR 71815, 71817 (Dec. 30, 1998) ("In general, EPA believes that because agricultural sources in the United States vary by factors such as regional climate, soil type, growing season, crop type, water availability, and relation to urban centers, each PM-10 agricultural strategy is uniquely based on local circumstances."). *See also Vigil v. Leavitt*, 381 F.3d 826, 838 (9th Cir. 2004).

and the wide range of economic circumstances and other factors facing farmers and operators within a nonattainment area.

One way in which the Agricultural BMP PM rules accommodate the variable nature of agricultural operations and crops, is to provide the option of multiple BMPs to control different sources. Most agricultural operations are different from one another and while they are only required to implement one BMP, they are encouraged to implement more than one BMP, which they do when feasible. Of course, if agricultural operators were required to implement multiple BMPs, there would be fewer emissions, but multiple BMPs are not always reasonable for all operators at all times, nor cost effective. Multiple BMPs can be very expensive, and the expense may vary over the course of the year, impacting cost predictability. After careful assessment and deliberation over their operations, the Committee decided that the required BMPs are those that can be reasonably implemented. In addition, the rule requires more accountability than other PM_{10} nonattainment area programs,[49] in that it requires a three-year survey submission to report on crop acreage and BMP activity choices under regular and high risk conditions. The Committee's final rules liken to BACM measures in other areas such as Imperial and San Joaquin Counties, as shown in Exhibit F-III – Agriculture Comparison.

Throughout the development of this rule the Committee has been particularly wary of implementing a rule that could result in a high cost to the West Pinal community in terms of present and future supply of natural resources. The potential high cost is especially evident when considering the potential unavailability and/or rise in monetary price of water in the future.[50] The Committee has tried to develop a sustainable and holistic rule that furthers the purposes of the SIP and the agricultural best management practices statute—to reduce particulate matter emissions—while concurrently accounting and planning for soil, water, and other natural resource conservation.

One of the most important practical limitations to reducing PM emissions in the West Pinal nonattainment area is the availability of water. Arizona's semi-arid climate and rapidly growing population causes constant water supply difficulties.[51] The limited supply compels the state's existing inhabitants to conserve water as much as possible.

Arizona has four legal sources of water, "surface water flowing from springs or in natural channels, groundwater, Colorado River water, and effluent."[52] The three primary sources of water are state surface water, Colorado surface water, and groundwater.[53] Central and southern Arizona heavily relies on Colorado River water supplied by the Central Arizona Project ("CAP"), which moves water uphill through a 336 mile long canal.[54] Central Arizona also "relies on the Salt, Verde and Gila Rivers."[55] Groundwater is located in aquifers beneath the earth. Statistically, a majority of agricultural water demand

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[49] *E.g.* Imperial County Air Pollution Control District, Regulation VIII, Rule 806 (2005).
[50] *See generally* Tony Davis, *Farm Water to City Taps: It won't be cheap*, Tucson.com: Arizona Daily Star (May 23, 2015, 6:00 PM), http://tucson.com/news/local/farm-water-to-city-taps-it-won-t-be-cheap/article_2cbb2c99-dbdb-542b-9c1d-2254a82c88d4.html.
[51] *See Symposium: Water Law and Policy Conference: Good Intentions, Unintended Consequences: The Central Arizona Groundwater Replenishment District*, 49 Ariz. L. Rev. 339, 339 (2006).
[52] Michael J. Pearce, *The History of State and Federal Water Laws*, *in* Arizona Water Policy 26, 27 (Bonnie G. Colby & Katharine L. Jacobs eds., 2007).
[53] *See Symposium: Water Law and Policy Conference: Good Intentions, Unintended Consequences: The Central Arizona Groundwater Replenishment District*, 49 Ariz. L. Rev. 339, 339 (2006).
[54] *See* Michael J. Pearce, *The History of State and Federal Water Laws*, *in* Arizona Water Policy 26, 33 (Bonnie G. Colby & Katharine L. Jacobs eds., 2007).
[55] *Symposium: Water Law and Policy Conference: Good Intentions, Unintended Consequences: The Central Arizona Groundwater Replenishment District*, 49 Ariz. L. Rev. 339, 339 (2006).

in Arizona, generally, and in the West Pinal nonattainment area, is from groundwater reserves and CAP water.[56]

Surface water rights in Arizona are allocated according to prior appropriation, the history of which reaches back hundreds of years.[57] The doctrine essentially means that the first person to put surface water to a beneficial use acquires a superior right when weighed with later appropriators.[58] Adjudication regarding rights to the Gila River, for example, shows that in some cases, "prior appropriation claims exceed the amount of surface water available."[59] There is even competition to obtain rights to use CAP water.[60] According to the Colorado River Basin Project Act of 1968, the legislation authorizing construction of CAP, "if there is ever a shortage on the [Colorado River], deliveries to Arizona's CAP will be reduced to zero before California's apportionment is reduced at all."[61] Additionally, the CAP water supply state hierarchy dictates four categories in "descending order of priority in times of shortage: (1) Native American, (2) municipal and industrial, (3) non-Indian agriculture, and (4) excess water."[62] Agricultural, municipal, and industrial water users are all eligible to enter into a CAP Excess Water Contract, but the demand for excess water has increased "at the same time its overall availability has decreased."[63]

Groundwater rights are granted based on beneficial use in rural areas, and in Active Management Areas ("AMA"), areas of quantified and restricted water rights established by the Groundwater Management Act, water usage is highly limited order to curb over-drafting of aquifer reserves. Each AMA establishes a complex system of quantified rights based on the area-specific goals, such as economic drivers in the area, and water user distribution. The West Pinal PM nonattainment area is covered by three AMAs: Phoenix, Tucson,[64] and predominantly Pinal.[65] "In the Pinal AMA, where the economy is primarily agricultural, the management goal is to preserve that economy for as long as feasible, while considering the need to preserve groundwater for future non-irrigation uses."[66]

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[56] *See Active Management Areas*, Arizona Departement of Water Resources, http://www.azwater.gov/azdwr/StatewidePlanning/WaterAtlas/ActiveManagementAreas/PlanningAreaOverview/CulturalWaterDemandAgriculture.htm (last visited Sept. 8, 2015).
[57] *See generally* Michael J. Pearce, *The History of State and Federal Water Laws*, *in* Arizona Water Policy 26, 27 (Bonnie G. Colby & Katharine L. Jacobs eds., 2007).
[58] *See* Michael J. Pearce, *The History of State and Federal Water Laws*, *in* Arizona Water Policy 26, 33 (Bonnie G. Colby & Katharine L. Jacobs eds., 2007). *See generally* A.R.S. §§ 45-141 - 45-264; *Surface Water Rights*, Arizona Department of Water Resources, http://www.azwater.gov/AzDWR/SurfaceWater/SurfaceWaterRights/default.htm (last visited Sept. 8, 2015).
[59] *Symposium: Water Law and Policy Conference: Good Intentions, Unintended Consequences: The Central Arizona Groundwater Replenishment District*, 49 Ariz. L. Rev. 339, 340 (2006).
[60] *Id*.
[61] Michael J. Pearce, *The History of State and Federal Water Laws*, *in* Arizona Water Policy 26, 33 (Bonnie G. Colby & Katharine L. Jacobs eds., 2007).
[62] *Id*.
[63] *Excess Water*, Central Arizona Project, http://www.cap-az.com/departments/water-operations/excess-water (last visited Sept. 8, 2015).
[64] Only a very small relative portion of the Pinal Nonattainment area lies within the Tucson AMA.
[65] *Compare Phoenix Active Management Area Map*, Arizona Dept. of Water Resources, http://www.azwater.gov/AzDWR/WaterManagement/AMAs/PhoenixAMA/documents/Phoenix_AMA_Map.pdf (last visited Sept. 8, 2015), *with Pinal Active Management Area Map*, Arizona Dept. of Water Resources, http://www.azwater.gov/AzDWR/WaterManagement/AMAs/PinalAMA/documents/ch1-pinal.pdf (last visited Sept. 8, 2015), *and Tucson Active Management Area Map*, Ariz. Dept. of Water Resources, http://www.azwater.gov/AzDWR/WaterManagement/AMAs/TucsonAMA/documents/TAMA_map_large.PDF (last visited Sept. 8, 2015).
[66] *Active Management Areas (AMAs) & Irrigation Non-expansion Areas (INAs)*, Arizona Dept. of Water Resources, http://www.azwater.gov/AzDWR/WaterManagement/AMAs/default.htm (last visited Sept. 8, 2015).

Arizona is projected to run short of water within approximately 25 years if the state and its constituents do not continue to mitigate the threat of a water shortage through careful and prudent planning.[67] Recently, the Bureau of Reclamation released confirmation that the Department of Interior will not declare a shortage on the Colorado River in 2016, but that there is a possibility of a shortage in 2017.[68] No one person has control of the water supply. For example, ensuring future Colorado River water supply is an intrastate, interstate, and international effort within and between Arizona, other Colorado Basin states, the U.S., and Mexico.[69]

Through AMA enforcement, Arizona has already taken preliminary measures to regulate the agricultural community to ensure the availability of water in the coming years. For example, the Pinal AMA restricts water use to 20-30 gallons per day per head for use in dairy operations and beef feedlot yards, respectively.[70] That includes water use necessary for processing feed, water consumption for hydrating the animals, and water use for dust suppression. Feedlot industry representatives have explained that their processes already almost reach the conservation limit when using 3 to 6 gallons a day to suppress particulate matter.[71] Hence, the Agricultural BMP rule's use of a water volume measurement rather than a moisture content percentage allows for operational predictability in spite of limited water availability.

From a statistical perspective, the agricultural sector is a significant water stakeholder. Non-Indian agriculture is responsible for approximately 80 percent of the total annual groundwater use in the Pinal AMA.[72] In the years 2001 and 2005, groundwater agricultural demand in the Pinal and Phoenix AMAs equated to approximately 45.5 and 42 percent, respectively, of the total agricultural demand in those areas.[73] In the same years, CAP agricultural demand in the Pinal and Phoenix AMAs equated to approximately 47 and 32.5 percent, respectively, of the total agricultural demand in those areas.[74]

As a significant water stakeholder, the agricultural sector in Arizona must constantly plan for a possible imminent water shortage. These PM_{10} rules were developed to account for this very real concern. Although reducing the throughput of the agricultural sector could reduce its water use and PM_{10} emissions, this is not an economically sustainable approach. Pinal County farmers and commercial animal operations must use water to grow food and other commodities to provide essential benefits such as food security. According to the USDA, Arizona accounted for $81.5 million in beef exports and $1 billion in

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[67] Ariz. Dept. of Water Resources, *Arizona's Next Century: A Strategic Vision for Water Supply Sustainability* 45-46 (2014), *available at* http://www.azwater.gov/AzDWR/Arizonas_Strategic_Vision/documents/ArizonasFuture WaterSuppliesandDemands.pdf (last visited Sept. 8, 2015).

[68] *See Further Action Needed to Stave Off Future Water Restrictions*, Central Arizona Project (Aug. 17, 2015), http://www.cap-az.com/public/press-releases/439-bureau-of-reclamation-report-confirms-no-shortage-in-2016.

[69] *See id.*; *See generally* Anne Castle, *Busting Myths About Water Shortage*, The San Diego Union-Tribune (Sept. 25, 2013, 4:00 PM), http://www.sandiegouniontribune.com/news/2013/sep/26/busting-myths-about-water-shortage/.

[70] See Arizona Dept. of Water Resources, Third Management Plan for Pinal Active Management Area: 2000-2010 6-61-70 (1999) *available at* http://www.azwater.gov/azdwr/WaterManagement/AMAs/documents/ch6-pinal.pdf. *See also* Exhibit F-V: Information On a Gallons per Head Standard Providing More Benefits over a Strict Moisture Percentage for Feed Yard Pens, provided by Bas Aja of the Arizona Cattlemen's Association.

[71] *See* Exhibit F-V: Information On a Gallons per Head Standard Providing More Benefits over a Strict Moisture Percentage for Feed Yard Pens, provided by Bas Aja of the Arizona Cattlemen's Association.

[72] *Pinal AMA Agricultural Conservation Program*, Arizona Dept. of Water Resources, http://www.azwater.gov/ AzDWR/Watermanagement/AMAs/PinalAMA/PinalAMAAgricunltureConservationProgram.htm (last visited Sept. 8, 2015).

[73] *See Active Management Areas*, Arizona Departement of Water Resources, http://www.azwater.gov/azdwr/ StatewidePlanning/WaterAtlas/ActiveManagementAreas/PlanningAreaOverview/CulturalWaterDemandAgriculture.htm (last visited Sept. 8, 2015).

[74] *See Active Management Areas*, Ariz. Dept. of Water Resources, http://www.azwater.gov/azdwr/ StatewidePlanning/WaterAtlas/ActiveManagementAreas/PlanningAreaOverview/CulturalWaterDemandAgriculture.htm (last visited Sept. 8, 2015).

total plant products exports in 2013.[75] Pinal agriculture yields approximately a quarter of total plant product sales within the state.[76] Because of agriculture's high use of water and the increase of urban sprawl and ensuing water value imbalance,[77] farm cultural operators have turned their attention to effecting required and voluntary water conservation best management practices.[78]

Additionally, the PM_{10} rules incorporate Natural Resource Conservation Service (NRCS) standards in an attempt to ensure soil conservation for future crops and in order to secure additional funding through the U.S. Department of Agriculture's NRCS Environmental Quality Incentives Program (EQIP). Such funding helps to offset the costs of implementing additional BMPs (to prevent PM_{10} emissions) which would otherwise be cost-prohibitive. Animal operations, however, do not benefit from such funding, which makes some BMPs, especially those involving a great deal of water and time, economically and technically infeasible.

The finalized rules are feasible, effective, and minimize potential negative impacts on local agriculture, including cost. Each farmer may select those BMPs that are more economically feasible for their own individual operation, providing a flexible and effective control program. ADEQ expects compliance costs to be minimal to moderate per new commercial farmer/animal operator/irrigation district. From the Yuma Agricultural Best Management Practices rulemaking,[79] it was estimated that the cost range for implementing BMPs could range $5.00 to $10.00 per acre, depending upon the BMPs selected. To implement some BMPs, the costs could represent one-time costs, whereas other implementation costs could be recurring.

4.2.7 Comparison of Rule to Measures Adopted in Other Areas

Exhibit F-III – Agriculture Comparison compares the Pinal County Rule with BACM measures approved for Imperial and San Joaquin Counties.

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[75] U.S. Dept. of Agric., *U.S. Agricultural Exports, Commodity detail by State [New series]: Cal Yr 2000-2013* (Apr. 29, 2015) *available at* http://www.ers.usda.gov/data-products/state-export-data.aspx (last visited Sept. 8, 2015).
[76] Valorie Rice, The Changing Face of Agriculture in Arizona, Table 3, University of Arizona Economic & Business Research Center (Sept. 21, 2014), https://www.azeconomy.org/2014/09/featured/the-changing-face-of-agriculture-in-arizona/?share=stumbleupon.
[77] James Yoo et al., *The Value of Water Rights in Agricultural Properties in the Phoenix Active Management Area* 4 (Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, Washington, August 12-14, 2012) http://ageconsearch.umn.edu/bitstream/124095/2/AAEA_Paper_James_Yoo.pdf.
[78] *Agriculture Homepage*, Ariz. Dept. of Water Resources, http://www.azwater.gov/AzDWR/StatewidePlanning/Conservation2/Agriculture/default.htm (last visited Sept. 8, 2015).
[79] *Notice of Final Rulemaking*, 24 A.A.R. 2210 (June 10, 2005).

4.3 Fugitive Dust (General Rule)

4.3.1 Measure Title(s)

Pinal County Air Quality Control District (PCAQCD) Code of Regulations, Chapter 4, Article 1, West Pinal PM10 Moderate Nonattainment Area Fugitive Dust

Arizona Revised Statutes (ARS) § 49-424(11) (Authorizing and implementing statute for high risk forecast)

4.3.2 Copy of Ordinance, Rule or Regulation

See Appendix G, Exhibit G-VIII for the Notice of Final Rulemaking as published in the Arizona Administrative Register.

4.3.3 Implementation Schedule

The effective date of the rule is January 1, 2016; most measures will be fully implemented starting at this date. Paving and stabilization measures for unpaved roads will begin in 2016 and continue incrementally until fully implemented.

4.3.4 Basis for Consideration

In Appendix C1 of the General Preamble, EPA identified these measures for control of PM_{10} under the category Available Fugitive Dust Control Measures (see Table 4, Section 3.2.1).

Also considered were several rules adopted in the pacific southwest including: Imperial County Rule 800 General Requirements For Control Of Fine Particulate Matter (Pm-10); South Coast Air Quality Management District Rule 1186 PM10 Emissions From Paved And Unpaved Roads, And Livestock Operations; the Phoenix RACM FIP at 40 CFR Part 52.128, Rule for unpaved parking lots, unpaved roads and vacant lots; and Maricopa County Rule 310.01 Fugitive Dust from Non-Traditional Sources of Fugitive Dust.

4.3.5 Applicable to the Following Land Use Categories and Emission Generating Activities

The fugitive dust rule contains emissions reduction strategies for the sources listed in Table 9.

Table 9: Fugitive Dust Rule Applicable Sources

Emissions Type	Source Category
Windblown Emissions	Open Areas/Vacant Lots
Windblown and Activity-Based Emissions	Unpaved Lots (parking, maneuvering, etc.)
	Unpaved Roads
Activity-Based Emissions	Paved Public Roadway

Windblown emissions from disturbed Open Areas and Vacant Lots and Unpaved Lots are included in and evaluated as part of the significant land use categories Cleared Areas, Developed Lands – Urban, Developed Lands – Rural, and Desert Shrublands. Most windblown emissions from the unpaved shoulders of paved roadways are included in these same land use categories, with some additional emissions in the Other Windblown Dust [unclassified] category.

4.3.6 Discussion of Measure Benefits

Fugitive dust emissions from disturbed open areas and vacant lots were found to be significant primarily on high-wind days. Unpaved [parking] lots and unpaved road emissions were found significant on both high-wind and low-wind design days and paved roads were significant on low-wind days. The contingency measure obligation for the nonattainment area is 7,475.4 tons per year, implementable by 2018, if needed.[80] The measures which satisfy this requirement will be implemented proactively, starting on January 1, 2016. The control strategies contained in the fugitive dust rule help meet contingency goals by reducing PM_{10} emissions by approximately 3,000 tons per year in 2018 (see Table 10).

Table 10: Estimated Annual Emissions Reductions due to Implementation of the Fugitive Dust Rule[81]

Control Strategy	Emission Reduction Credit	Reduction (tpy)
Open Areas and Vacant Lots (all provisions)	Contingency	1,727.9
Unpaved [parking] Lots (all provisions)	Contingency	143.5
Unpaved Roads (all provisions)	Contingency	1,142.7
Paved Public Roadways (shoulders)	Contingency	7.6
Paved Public Roadways (trackout)	Contingency	< 5.0[82]
Paved Public Roadways (erosion)	No Credit Taken	Not Quantified
Total		≈ 3,026.7

4.3.7 Discussion of Technical and Economic Considerations

Tables 11, 13, 14, and 15 list the technical feasibility and cost standings, where available, of measures appropriate to disturbed open areas and vacant lots, unpaved lots, unpaved roads, and paved roads. Each table is followed by a discussion of the reasons for including or rejecting individual measures, in whole or in part, from the West Pinal controls strategy.

Estimated costs for the Pinal County Air Quality Control District (PCAQCD) are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning to determine any needed changes to associated dust and open burning permit fees.

[80] See *Appendix D, Pinal County PM10 Nonattainment Area 2018 Attainment Demonstration and Controlled Emissions Inventories (Attainment TSD)*.
[81] ADEQ estimated the emissions reductions based on 2018 assumptions (e.g., that 30 miles of unpaved road controls are in place, implemented in 2016 and 2017). All reductions are in tons per year.
[82] A 5 tpy reduction is collectively due to trackout provisions in the Construction and Fugitive Dust rules.

Open Areas and Vacant Lots

Table 11: Open Areas and Vacant Lots*			
Measure	**Technically Feasible**	**Reasonable Implementation Cost**	**Fugitive Dust Rule RACM**
1. Require dust control plan for off-highway vehicle use on public lands.	N	NE	N
2. Limit use of recreational vehicles on open land (e.g., confine operations to specific areas, require use permits, outright ban).	Y	Y	Y
3. Require vegetation, chemical stabilization, or other abatement of wind erodible soil, including lands subjected to water mining, abandoned farms, and abandoned construction sites.	Y	Y	Y
4. Limit trespass in open areas and vacant lots (e.g. motor vehicle travel or parking).	Y	Y	Y
5. Employ dust mitigation measures during weed abatement.	Y	Y	Y

***** Y = yes; N = no; P = partial (portions of available measure were found to be feasible); NA = not available or not applicable; NE = not evaluated.

Measure 1. Require dust control plan for off-highway vehicle use on public lands

Arizona law prohibits driving a motorized vehicle "cross-country" on public or private lands where prohibited by rule or regulation or, in the case of private lands, by posting.[83] Further, off-highway vehicle (OHV) travel is limited to roads, trails, routes or areas that are "*opened"* by the land management agency.[84] Operation of off-highway vehicles is not allowed on roads, trails, routes or areas that are "*closed"* by regulation of a federal agency, the state, a county or a municipality or by proper posting if the land is private land. In general, OHVs cannot be operated in a manner that damages the environment, including generation of excessive air pollution, where it is prohibited by rule, regulation, ordinance or code. The Arizona Game and Fish Department publishes "*Arizona Off-highway Vehicle Guide, OHV Laws and Places to Ride*" to ensure public understanding and compliance, and enforces off-highway vehicle laws including on public lands under state or local jurisdiction.

The Bureau of Land Management (BLM) indicates that most lands managed by Arizona BLM are designated as "*limited areas*."[85] Vehicle use in limited areas may be restricted to certain times, in certain areas, and/or to certain vehicular use. Use is generally limited to designated roads and trails, or in some cases dry washes. Overland vehicle travel is not permitted.

The Pinal County Air Quality Control District tracks dust complaints received from all terrain vehicle (ATV)/OHV activity. Dust complaints on public lands comprise a relatively small fraction of total OHV complaints in the nonattainment area (see Table 12). Requiring additional dust control plans for OHV use on public lands was found not reasonable because management of OHV use on public lands is already

[83] A.R.S. § 17-454. Citation is provided for reference purposes only and not for approval as part of the SIP.
[84] A.R.S. § 28-1174. Citation is provided for reference purposes only and not for approval as part of the SIP.
[85] See the Arizona BLM Website at http://www.blm.gov/az/st/en.html.

occurring, the measure does not target the primary geographical area of OHV use/complaints (i.e. private land), and additional control is unlikely to result in measurable emissions reductions in the West Pinal area.

Table 12: West Pinal County Nonattainment Area Fugitive Dust Complaints (ATV/OHV)

Year	Total ATV/OHV Complaints	Public Land ATV/OHV Complaints	Percent (%) of Complaints on Public Lands
2008	20	4	20.0%
2009	17	1	5.9%
2010	16	4	25.0%
2011	6	1	16.7%
2012	15	2	13.3%
2013	6	0	0.0%
2014	13	3	23.1%

Measure 2. Limit use of recreational vehicles on open land

As noted under *Measure 1, Require dust control plan for off-highway vehicle use on public lands,* OHV travel is limited to roads, trails, routes or areas that are *opened* by land management agencies and is not allowed on posted private land (see discussion above).

The Fugitive Dust Rule includes additional measures to restrict trespass, including recreationl vehicles, in open areas and vacant lots (§ 4-3-030(2)(B)). The rule contains requirements for posting "no trespassing" signs or installing physical barriers to restrict access, upon evidence of tresspass. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them. This measure is discussed in more detail under *Open Areas/Vacant Lots, Measure 4, Limit trespass in open areas and vacant lots* below.

Measure 3. Stabilize wind erodible soil

Section 4-3-030(2)(A) of the Fugitive Dust Rule limits dust emissions in open areas and vacant lots to 20 percent opacity. Owners and/or operators of open areas and vacant lots 1.0 acre or larger that have a cumulative 0.5 acre or more disturbed surface area are required to implement at least one of the specified measures to stabilize the area, including:

- Application of water or dust suppressants,
- Establish vegetation,
- Install/maintain pavement,
- Apply/maintain gravel,
- Apply/maintain chemical/organic stabilizers, or
- An approved alternative method.

Additionally, owners/operators are required to ensure that disturbed areas are stabilized the day before and the day that is forecast to be high risk for dust emissions (includes high wind and stagnation events). The forecast and stabilization requirements target days with the most potential for elevated PM_{10}.

For those areas that do reach the 1 acre threshold, there may be some incremental costs associated with determining the stability of affected areas and for implementing dust mitigation measures. Sample capital cost estimates are as follows:

- Establish a vegetative cover, $16,000-21,000 per acre;[86]
- Restore to native vegetation, $16,208-21,732 per acre;[87]
- Apply gravel (1 inch depth, 3/8 inch chip), $3,049 per acre;[88]
- Apply chemical dust suppressant (magnesium chloride/polymer blend), $3,485 per acre;[89]
- Install asphalt concrete (2 inch depth, 19 mm), $73,616 per acre.[90]

This measure was determined reasonable because of the wide range of control options (and associated costs) available for stabilizing wind erodible soil.

The Construction Rule also contains provisions for reducing emissions from these sources (see Section 4.1).

Measure 4. Limit trespass in open areas and vacant lots

Arizona law prohibits trespass, including motorized vehicles, on public or private lands where prohibited by rule or regulation or, in the case of private lands, by posting. To minimize initial or additional soil disturbance, the West Pinal Fugitive Dust Rule includes measures to restrict trespass in open areas and vacant lots (§ 4-3-030(2)(B)). The rule contains requirements for installation of "no trespassing" signs or physical barriers to restrict access upon evidence of tresspass. Physical barriers include fences, gates, posts, trees, or other measures to effectively prevent access.

Some incremental costs associated with posting of signs or installation of barriers may be incurred by the the owner and/or operator of an open area. Previous evaluation of costs associated with measures for restricting access show that expenditures vary widely depending on the size of the affected area and control measure chosen. As an example, unit cost estimates include:

- $200 per sign for posting signage,[91]
- $11-13 per linear foot for chain link fencing,[92] and
- $7-8 per linear foot for boulders.[93]

Installation costs could range from $1,000.00 (5 signs)[94] to more than $10,000 for fencing on a one-acre (square) parcel of land. This measure was determined reasonable because of the wide range of control options (and associated costs) available for limiting trespass.

The Construction Rule also contains provisions for reducing emissions from soil disturbance caused by trespass (see Section 4.1).

Measure 5. Dust mitigation measures during weed abatement

Provisions in the Fugitive Dust Rule (§ 4-1-030(2)(E)) include measures to prevent or minimize fugitive dust prior to, during, and after vegetation removal (blading, discing, plowing) in open areas and vacant

[86] *Final Revised PM10 State Implementation Plan for the Salt River Area*, ADEQ, September 2005.
[87] *Id*.
[88] Email communication from Scott DiBiase, Pinal County AQCD, to Bruce Friedl, ADEQ, dated August 20, 2015.
[89] *Id*.
[90] *Id.*
[91] *2009 Imperial County State Implementation Plan for Particulate Matter Less Than 10 Microns in Aerodynamic Diameter, Final*, August 11, 2009.
[92] *Final Revised PM10 State Implementation Plan for the Salt River Area*, ADEQ, September 2005.
[93] *Id*.
[94] Assumes posting on four sides/corners and at one access point.

lots. The rule requires the owner/operator to stabilize disturbed areas by application of gravel, dust suppressants, or an alternative measure and to prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces.

Costs associated with application of gravel, dust suppressants, and clean-up of any trackout are discussed under *Open Areas/Vacant Lots, Measure 3. Stabilize wind erodible soil* and *Paved Public Roadways, Measure 3. Provide for traffic rerouting or rapid clean-up of temporary sources of dust on paved roads.*

Unpaved Lots

Table 13: Unpaved Lots*			
Measure	**Technically Feasible**	**Reasonable Implementation Cost**	**Fugitive Dust Rule RACM**
1. Require paving, chemically stabilizing, or otherwise stabilizing permanent unpaved haul roads, and parking or staging areas at commercial, municipal, or industrial facilities.	Y	Y	Y
2. Pave, vegetate, or chemically stabilize unpaved parking areas.	Y	Y	Y

* Y = yes; N = no; P = partial (portions of available measure were found to be feasible); NA = not available or not applicable; NE = not evaluated.

Measure 1. Require paving or stabilizing permanent unpaved haul roads, parking, and staging areas at commercial, municipal, or industrial facilities

The Fugitive Dust Rule includes measures to stabilize unpaved parking, maneuvering, material handling, and storage areas. See Measure 2 discussion below.

Measure 2. Pave, vegetate, or chemically stabilize unpaved parking areas

Unpaved parking and traffic areas contribute to emissions of PM_{10} through three separate processes: (1) the mechanical re-entrainment of fugitive dust as vehicles travel over an unpaved or non-stabilized surface; (2) trackout of material onto adjacent paved surfaces, including public roadways, where it is subsequently re-entrained into the air by passing vehicles; and (3) windblown dust generated by wind passing over unpaved areas that have been disturbed by vehicles. The Fugitive Dust Rule requires the owner and/or operator of an unpaved parking, maneuvering, material handling, or storage areas to pave, apply dust suppressants, maintain surface gravel or otherwise stabilize the area (§ 4-3-030(3)). Visible emissions are limited to 20 percent opacity. The rule applies to unpaved lots greater than 5,000 square feet in size.[95]

For those areas that reach the size threshold, there may be some incremental costs associated with determining stability of affected areas and for implementing dust mitigation measures. Sample capital cost estimates are as follows:

- Apply gravel (1 inch depth, 3/8 inch chip), $305 per 0.1 acre;[96]

[95] Five thousand (5,000) square feet is approximately equal to 0.11 acres. For certain comparisons, however, the value is rounded to 0.1 acres.
[96] Email communication from Scott DiBiase, Pinal County AQCD, to Bruce Friedl, ADEQ, dated August 20, 2015.

- Apply chemical dust suppressant (magnesium chloride/polymer blend), $349 per 0.1 acre;[97]
- Install asphalt concrete (2 inch depth, 19 mm), $7,362 per 0.1 acre.[98]
- Install concrete (6 inch depth), $9,583 per 0.1 acre.[99]

This measure was determined reasonable because of the wide range of control options (and associated costs) available for stabilizing unpaved parking and traffic areas.

The Construction and Agriculture BMP rules also contain provisions for reducing emissions from these sources (see Sections 4.1 and 4.2).

Unpaved Roads

Table 14: Unpaved Roads*			
Measure	**Technically Feasible**	**Reasonable Implementation Cost**	**Fugitive Dust Rule RACM**
1. Develop traffic reduction plans for unpaved roads. Use of speed bumps, low speed limits, etc., to encourage use of other (paved) roads.	N	NE	N
2. Pave or chemically stabilize unpaved roads.	Y	Y	Y

* Y = yes; N = no; P = partial (portions of available measure were found to be feasible); NA = not available or not applicable; NE = not evaluated.

Measure 1. Develop traffic reduction plans

Traffic reduction plans can be effective in areas of dense roadway networks, where the traveling public is not significantly inconvenienced by having to use alternative paved roads in place of unpaved roads. In the rural portions of the West Pinal County PM_{10} nonattainment area, however, this measure is not feasible because of the substantial increases in route lengths that would have to be driven through the selective closure of unpaved roads.

Measure 2. Pave or chemically stabilize unpaved roads

The Fugitive Dust Rule (§ 4-1-030(4)) requires the owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 to limit fugitive dust emissions to no greater than 20 percent opacity and to apply one of the following measures:

- Pave,
- Apply/maintain dust suppressants (other than water), or
- Apply/maintain surface gravel.

Control requirements apply to roads owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies, which is consistent with previously approved Phoenix area RACM

[97] *Id.*
[98] *Id.*
[99] *Id.*

measures.[100] Controls must be annually implemented on 15 miles of roadway per year. The selection of a 15 mile per year incremental schedule is based on capital and maintenance costs, available funding, and the amount of emissions reductions necessary to meet contingency measure goals. This approach is consistent with measures applied in other areas in the southwest U.S. See Exhibit F-IV, Rule Section 4-1-030(4), for a comparison to controls adopted in other PM_{10} planning areas. Measures applicable to private unpaved farm roads, irrigation district roads, and unpaved construction roads are included in the Agriculture and Construction Rules (see Sections 4.1 and 4.2).

Costs associated with the listed unpaved road measures are estimated below:

- Apply gravel (1 inch depth, 3/8 inch chip, 28 feet wide), $10,000 per mile and for a maintenance cycle of one month, yearly cost is $120,000;[101]
- Apply chemical dust suppressant (magnesium chloride/polymer blend, 28 feet wide), $12,000 per mile, and for a maintenance cycle of four months, yearly cost is $48,000;[102]
- Install asphalt concrete (2 inch depth, 19 mm, 28 feet wide), $250,000 per mile;[103]
- Install concrete (6 inch depth, 28 feet wide), $325,000 per mile;[104]
- Install chip-seal (28 feet wide), > $100,000 per mile.[105]

The regulated community in the rule includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The unpaved road requirements will add significant costs to all these regulated entities. Because of the gross cost and burden on the nonattainment area infrastructure that will be incurred due to paving or otherwise stabilizing unpaved roads, a multi-year implementation schedule was chosen. Pinal County estimates an additional expenditure of $3,000,000 per year will be required to achieve a 15 miles per year paving goal (contracted chip-seal) from 2016-2018.[106] According to the ADT estimates used for the base year inventory (2008), there were 180 miles of unpaved roads over 150 ADT in the West Pinal Nonattainment Area. Per the examples above, application of dust suppressants on 180 miles of roadway would cost approximately $8,640,000 per year and approximately $21,600,000 per year for gravel.

The form of the PM_{10} NAAQS is a three year average (calendar year), therefore, emissions reductions for measures designed to attain the standards in the West Pinal Nonattainment area must begin in January 2016, to meet the December 2018 attainment deadline. For this reason, the unpaved road measures are not relied upon to advance attainment of the NAAQS or to demonstrate attainment by the applicable date. In order to demonstrate attainment, ADEQ chose other measures (see Section 4.2) that would be fully implemented upon a rule's effective date, rather than those measures which are implemented on a graduated schedule (such as paving of unpaved roads).

Emissions reductions from unpaved road measures are credited toward contingency objectives. The contingency measure obligation for the nonattainment area is an emissions reduction of 7,475.4 tons per

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[100] See 40 CFR 52.128, *Rule for unpaved parking lots, unpaved roads and vacant lots*. 64 FR 71308; December 21, 1999.
[101] Email communication from Scott DiBiase, Pinal County AQCD, to Bruce Friedl, ADEQ, dated August 20, 2015.
[102] *Id*.
[103] *Id*.
[104] *Id*.
[105] *Id*. Estimate is based on the case where the work is completed by Pinal County. Application of controls on the additional mileage required by this regulation (in addition to what has already been scheduled in 2016-2018) will likely be beyond the in-house capacity of the County and the paving work may be done through contract, thereby increasing the per mile cost.
[106] Email communication from Scott DiBiase, Pinal County AQCD, to Andrew Steckel, U.S. EPA, dated July 30, 2015.

year, implementable by 2018, if needed. Most of the measures designed to satisfy this requirement will be applied proactively, starting on January 1, 2016. These measures include:

- Controls on commercial dairy operations, estimated to reduce nonattainment area emissions by 101.2 tpy (see the Agriculture Rule in Section 4.2);
- Controls on construction, estimated to reduce nonattainment area emissions by 4,686.6 tpy (see the Construction Rule in Section 4.1);
- Controls on a variety of other sources of fugitive dust (open areas and vacant lots, unpaved parking lots, unpaved shoulders of paved roads), estimated to reduce nonattainment area emissions by 1,879.0 tpy (see the Fugitive Dust Rule in Section 4.3); and
- Controls on trackout (construction and other sources), estimated to reduce nonattainment area emissions by 5 tpy (see Table 5, Section 4.1.6 and Table 10, Section 4.3.6).

After subtracting the above reductions from the total contingency measure obligation, the unpaved roads portion of the Fugitive Dust Rule must make up a shortfall of 803.6 tpy throughout the nonattainment area. ADEQ estimates that application of controls on 15 miles of unpaved roads per year will reduce emissions by 1,142.7 tons per year by 2018, exceeding contingency reduction objectives.[107] Details of the analysis are fully described in Appendix D, Section D5.2.

The Fugitive Dust Rule also includes an equivalency option (only effective after the modeled attainment date) which allows for the paving of roads with traffic under 150 ADT as long as the resulting emissions reductions are equivalent to reductions that would occur by paving 15 miles of roads with 150 ADT or above. In 2019, the area may begin paving equivalency roads. Paving a length of road with less than 150 ADT requires that owner/operators pave a greater distance than 15 miles in order to accomplish the same emissions reductions as paving roads with 150 ADT. Because there is no sunset provision that applies to the unpaved road section of the rule, the requirement to apply controls to roads above 150 ADT does not at this point expire and application of measures on all roads above the threshold must still be achieved.

Paved Public Roadways

Table 15: Paved Roads*

Measure	Technically Feasible	Reasonable Implementation Cost	Fugitive Dust Rule Measure
1. Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.	P	P	P
2. Require haul trucks to be covered.	P	Y	N
3. Provide for traffic rerouting or rapid clean-up of temporary sources of dust on paved roads (water erosion, runoff, mud/dirt track out, material spills).	Y	Y	Y
4. Require curbing and pave or stabilize road shoulders.	P	P	P
5. Provide for storm water drainage to prevent water erosion onto paved roads.	N	NE	N
6. Employ certified street sweepers.	N	Y	N

[107] Emissions reduction estimate is based on application of a combination of controls (e.g., synthetic palliative; chip-sealing, double-chip-sealing, or cape-sealing; paving).

* Y = yes; N = no; P = partial (portions of available measure were found to be feasible); NA = not available or not applicable; NE = not evaluated.

Measure 1. Pave, vegetate, or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads

The Agricultural Best Management Practices (AgBMP) Rule includes trackout requirements for agricultural activities including unpaved traffic surfaces (see Section 4.2). The Construction Rule contains "prevention of trackout" requirements, including installation of trackout control devices and chemical stabilization, for construction related activities (see Section 4.1). Trackout control device is defined as a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.

Weed abatement provisions (for open areas and vacant lots) in the Fugitive Dust Rule (§ 4-1-030(2)(E)) include requirements to prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces. Measures require stabilization of disturbed areas including application of gravel and dust suppressants and clean-up of any trackout that does occur (see discussion of Open Areas and Vacant Lots above).

Additionally, measures to reduce emissions from unpaved (parking, material handling, storage) lots (§ 4-1-030(3)) require stabilization of these surfaces (paving, gravel, dust supressants) where they may adjoin paved roadways (see discussion of Unpaved Lots above).

Estimated costs associated with controlling trackout and carryout onto paved roadways include: paving, $6,000 to $8,500 per access point; chemical stabilization, $984; gravel, $680 to $1,360 per year per access point; and trackout control devices, $3,500 to $4,800 plus maintenance costs.[108] Actual costs are dependent on the control option selected and local material and labor costs.

Measure 2. Require haul trucks to be covered

Material handling, transport, and storage contributing to dust emissions in the nonattainment area are primarily due to construction, earthmoving, and agriculture related activites. As such, measures to mitigate emissions from these activities are included in the Construction and Agriculture Rules discussed in Sections 4.1 and 4.2 of this document.

Measure 3. Provide for traffic rerouting or rapid clean-up of temporary sources of dust on paved roads

The requirements for clean up of trackout and erosion caused deposition in the Fugitive Dust Rule are provided at § 4-1-030(5)(A). Additional trackout provisions for construction and earthmoving activities are included in the Construction Rule at § 4-3-170(4) (see Section 4.1).

Clean-up of deposition on paved roads will create incremental costs to the regulated entities (owner/operator of property where trackout originated). Choices for clean-up include manual sweep and pick-up, rotary brush or broom, and PM_{10} efficient street sweeper. Current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the affected portion of the paved road. Actual costs depend on the size of the trackout or erosion event and method of

[108] *2009 Imperial County State Implementation Plan for Particulate Matter Less Than 10 Microns in Aerodynamic Diameter, Final*, August 11, 2009.

clean-up. Estimates for clean-up from other districts are as low as several hundred dollars per event.[109] This measure was determined reasonable because the technology is available and because of the broad range of options (and associated costs) available for clean-up.

Mesure 4. Require curbing and pave or stabilize road shoulders

The rule includes stabilization requirements for work done on unpaved shoulders and requires the owner/operator of an existing paved public roadway to apply a dust suppressant(s) (water, hygroscopic material, chemical stabilizers, other as approved) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface (§ 4-1-030(5)(A)). There is also a trackout provision attributed to the treatment of unpaved shoulders which requires the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper (see discussion under *Measure 3. Provide for traffic rerouting or rapid clean-up of temporary sources of dust on paved roads above*). The stabilization requirements associated with any work done on unpaved shoulders will also add incremental costs to the regulated community. Costs associated with potential paved road shoulder measures are estimated below:

- Install asphalt concrete (2 inch depth, 19 mm), $1.69 per square foot or $35, 693 for an area 4 feet wide and one mile long;[110]
- Watering Control Measure: total treatment cost (for approximately 11,733 square yards) $1,615; assuming a maintenance cycle of four times/month equates to a yearly cost of $77,524.80. For treating an area 4 feet wide and one mile long the annual cost is $15,505.[111]

Curbing in urban areas is already required under many municipal zoning codes for new developments and is not a feasible option in rural areas. Paving shoulders may remove some of the available funding for paving public unpaved roads. Paving/stabilizing unpaved roads likely has a larger emissions reduction impact in the nonattainment area. Therefore, it is generally more cost effective (and better for emissions reductions) to pave or treat more miles of public unpaved roads rather than paving fewer miles and adding paving to selected road shoulders.

Measure 5. Provide for storm water drainage to prevent water erosion onto paved roads

Water erosion runoff occurs only infrequently during periods of heavy rain; usually generated by intense, localized thunderstorms that occur in the late summer and early fall. In areas of higher terrain, with greater topographic relief, runoff is generally contained in stream and normally dry wash channels. Any erosion onto paved surfaces is usually narrowly restricted to where these flows may cross roadways. Because emissions from entrainment of erosion sediment on paved roads are very localized and minimal, and rerouting of storm water channels or roadways require significant time and infrastructure investment, this measure is not feasible in these areas.

Much of the remainder of the nonattainment area is comprised of broad flat basins where topographic relief is minimal and floodwater can spread widely (desert, open areas, agricultural areas, etc.). Due to the low gradient in these areas, drainage channels may not be well defined, their positions may shift

[109] An estimate for clean-up of a 3 ton water-borne deposition event for San Joaquin, CA, totaled $640.00 for the county public works department utilizing three personel, a grader, and a water truck for four hours. See *Final BACM Technological and Economic Feasibility Analysis, San Joaquin Valley Unified Air Pollution Control District*. Sierra Research, March 2003.
[110] Email communication from Scott DiBiase, Pinal County AQCD, to Bruce Friedl, ADEQ, dated August 20, 2015.
[111] Email communication from Scott DiBiase, Pinal County AQCD, to Bruce Friedl, ADEQ, dated August 28, 2015.

during flooding, and inundation can be widespread.[112] Drainage control requires substantial research and infrastructure investment. Additional measures, beyond those already accomplished by the local flood control district and public works departments, cannot likely be achieved by the January 2016 implementation date or prior to the attainment date. Therefore, this measure would not significantly advance attainment of the NAAQS and is not feasible in these areas.

Because this measure is unlikely to result in significant emissions reductions prior to the attainment date, the control strategy for erosion onto paved roads focuses on access restrictions for safety during flooding and rapid cleanup following these infrequent events.

Measure 6. Streetsweeping

Street sweeping reduces PM_{10} on paved roads, which consequently reduces reentrainment of PM_{10} by vehicles traveling on the roadway. PM_{10} efficient street sweepers provide additional emissions reductions over conventional sweepers by further reducing the silt load present on the road surface cleaned by the sweeper and by the reduction in dust from the actual sweeping process.[113]

A typical BACM measure requires that future purchases or replacement of street sweeping equipment in urban areas be certified PM_{10} efficient. A recent report estimated capital costs for purchasing a (full size municipal) street sweeper ranging from $140,000 to $250,000 depending upon the sweeper type (mechanical, regenerative-air, vacuum, etc.) and the options included.[114] PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximatly $13,500.00 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing. The majority of the incorporated cities and towns in the West Pinal PM_{10} Planning Area already implement street sweeping programs, employing both conventional and PM_{10} efficient street sweepers. For example; Coolidge operates one PM_{10} efficient street sweeper, Casa Grande operates four PM_{10} efficient street sweepers, Maricopa utilizes four PM_{10} efficient street sweepers with two new ones expected by the end of the year, and Eloy employs one conventional sweeper.

ADEQ determined that (1) PM_{10} efficient street sweeping is already being implemented in local jurisdictions (e.g. the largest incorporated cities and towns in the West Pinal Planning Area) and the addition of a new measure is unlikely to result in significant emissions reductions; and (2) for those areas not operating PM_{10} efficient sweepers, existing equipment may not be scheduled for replacement in the near term, and acquiring dedicated funding and procurement of equipment cannot feasibly be accomplished by the January 2016 implementation date and therefore would not significantly advance attainment of the NAAQS.

4.3.8 Comparison of the Pinal County Rule with Measures Adopted in Other Areas

Exhibit F-IV compares the Pinal County Fugitive Dust Rule with BACM and RACM strategies adopted and approved for other nonattainment areas in the Pacific Southwest.

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[112] *Geology and Geologic Hazards of the Casa Grande Area, Pinal County, Arizona*. Arizona Geological Survey, Open-File Report 98-23 (Preliminary). September, 1998.
[113] Procedures for determining the PM_{10} efficiency of street sweeping equipment were established in *Rule 1186: Appendix A; South Coast Air Quality Management District Test Protocol, Rule 1186-Certified Street Sweeper Compliance Testing.* September 1999.
[114] *2008 RIC06, Resource for Implementing a Street Sweeping Best Practice*. Minnesota Department of Transportation. February 2008.

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Exhibit F-I – Available Measures

List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
Paved Roads			
SCAQMD Rule 1186, PM_{10} Emissions from Paved and Unpaved Roads, and Livestock Operations	Owners of public paved roads must remove trackout within 72 hours. Government contracts for street sweeping shall use only certified sweeping equipment. Beginning in January 2006, new construction or widening of paved roads must meet specified curb and shoulder requirements and pave medians. [South Coast Rule 403 includes BACM measures for road shoulder maintenance (water prior to clearing, chemical suppressants and/or washed gravel to maintain a stabilized surface after shoulder maintenance). Guidance encourages curbing or paving. Applicable to all construction activity sources.]	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005). New version approved on March 7, 2012 (77 FR 13495), but did not change paved road portion.	BACM
ICAPCD Rule 800, General Requirements for Control of Fine Particulate Matter (PM-10); Rule 801, Construction and Earthmoving Activities; Rule 802, Bulk Materials; Rule 803, Carry-out and Track-out; Rule 805, Paved and Unpaved Roads; Rule 806 Conservation Management Practices	Rules contain measures addressing PM_{10} emissions from carry-out and track-out onto paved surfaces, and unpaved shoulders and medians.	Rule 800 revised October 16, 2012 (78 FR 23677, April 22, 2013). Rules 801,802,803 revised November 8, 2005 (75 FR 39366, July 8, 2010). Rules 804, 805, 806 revised October 16, 2012 (78 FR 23677, April 22, 2013).	BACM
Maricopa County Rule 310.01, Fugitive Dust From Non-Traditional Sources of Fugitive Dust	Rule contains various measures including emissions mitigation procedures for erosion-caused deposition of bulk materials onto paved surfaces.	Rule 310.01 revised January 27, 2010 (75 FR 78167, December 15, 2010).	BACM/MSM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
SJVAPCD Rule 8061, Paved and Unpaved Roads; Rule 8021, Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities	Rule includes measures for reducing emissions from paved roads including stabilization of road shoulders and medians, curbing, street sweepers, and post-event clean-up and track out.	Rules 8061 and 8021 revised August 19, 2004 (71 FR 8461, February 17, 2006).	BACM
Clark County Rule 93, Fugitive Dust from Paved Roads and Street Sweeping Equipment	Includes measures for stabilizing road shoulders and medians, curbing, and street sweeping.	Rule 93 revised April 15, 2014 (79 FR 60078, October 6, 2014)	
Unpaved Roads			
SJVAPCD Rule 8061, Paved and Unpaved Roads	Requires 20% opacity limit for use ≥ 75 vehicle trips/day; 20% opacity and stabilized surface for use ≥ 100 trips/day. The District committed to lower this threshold to 26 vehicle trips, add new requirements for city owned roads, and modify the format and reporting requirements of Rule 8061. Units used are Average Daily Traffic (ADT).	2003 PM_{10} SIP[1] (68 FR 8830-8835; February 26, 2003)	RACM
	Requires 20% opacity limit and stabilized surface for use ≥ 26 trips/day (see comment above); pave 20% of unpaved roads each year. By January 1, 2010, pave an average of 20% annually of all unpaved roads identified in Section 5.2.3.1.1 up to a maximum of 5 cumulative miles within any one urban area, with priority given to roads with the highest AADT levels. In meeting this requirement each jurisdiction must show incremental progress (Section 5.2.3.1.3). Section 5.2.3.1.1 requires; by January 1, 2005, entities provide the District with a list of all unpaved roads under its jurisdiction in any urban area(s), including data on length of, and ADT on,each unpaved road segment.	2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004)	BACM
SCAQMD Rule 1186, PM_{10} Emissions from	Section 186(d)(5) requires owners of public unpaved roads to pave 1 mile, treat 2 miles, or extend speed control to 3 miles of unpaved road	1998 South Coast AQMP[2] (70 FR 69081-	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
Paved and Unpaved Roads, and Livestock Operations	per year (for 9 calendar years). Roads treated must be roads that have greater than the average ADT of all roads in the owner's jurisdiction.	69085; November 14, 2005). New version approved on 3-7-2012 (77 FR 13495), but did not change unpaved road portion.	
MDAQMD Rule 403.2, Fugitive Dust Control for the Mojave Desert Planning Area	Requires cities, towns, and the county to stabilize publicly maintained heavily traveled unpaved roads to reduce fugitive dust entrainment and wind erosion by at least 1,541 tons per year of PM10 emissions within the MDPA.	1995 PM_{10} SIP[3] [Rule was adopted on July 22, 1996, submitted to EPA on October 18, 1996. EPA has not taken any action.]	RACM
ICAPCD Rule 805, Paved and Unpaved Roads	Requires cities and county to stabilize (to achieve 20% opacity) 10% of public unpaved roads with AADT ≥ 50 vehicles/day each year from 2005 to 2015 The compliance schedule (Section E.7.b) requires, for the period 2006 through 2015, a 10% per year compliance rate for 20% VDE and the requirements for a Stabilized Unpaved Road (Treatment in excess of the annual requirement can be credited toward future year requirements). The compliance plan shall identify the control measures implemented or that will be implemented at each Unpaved Road segment with 50 or more Average Vehicle Trips per Day. The plan shall clarify that the 10% stabilized each year differ from the roads previously stabilized so that 100% of roads are stabilized by 2015.	2009 PM_{10} SIP[4] (75 FR 39366-39390; July 8, 2010. 78 FR 23677-23683; April 22, 2013)	BACM
Clark County Rule 91, Fugitive Dust from Unpaved Roads, Unpaved Alleys, and Unpaved Easement Roads	Requires unpaved roads with AADT ≥ 150 vehicles/day to be controlled by paving, palliatives, or other approved measure. Fugitive dust emissions from unpaved roads and alleys must not exceed 20% opacity and equal or exceed 0.33 oz/ft^2 silt loading, or not exceed 6% silt content (determined by Subsection 91.4.1).	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004). Initial adoption by Clark County on June 22, 2000. Amended on November	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	Rule includes a staggered implementation schedule for unpaved roads constructed before 2000 and a separate section for roads prior to 2002. Requires control measures to be implemented on 1/3 of unpaved roads over 150 ADT by 6/1/2001; 2/3 of unpaved roads by 6/1/2002; and all unpaved roads by 6/1/2003 [for roads prior to 2000]. Section 91.4 includes test methods for opacity and silt content.	16, 2000; December 21, 2000; June 3, 2003; July 1, 2004; April 15, 2014. The submitted plan included the November 16, 2000 version of the rule. This action approved revised versions of Sections 90 – 93 that were dated November 20, 2001 and submitted to EPA on October 24, 2002, which supersede earlier versions.	
Maricopa County Rule 310.01 Fugitive Dust From Non-Traditional Sources of Fugitive Dust	Requires unpaved roads with AADT ≥ 150 vehicles/day to be controlled by paving, applying surface gravel, or other dust suppressants so visible dust emissions do not exceed 20% opacity. Rule limits silt loading equal to or greater than 0.33 oz/ft^2. If silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%.	1999 PM_{10} SIP[6] (67 FR 48718-48739; July 25, 2002) Revised rule approved as part of EPA's 12/15/2010 action (75 FR 78167). No changes to unpaved road requirements. Adopted by Maricopa County on 1/27/2010.	BACM
40 CFR 52.128, Rule for unpaved parking lots, unpaved roads and vacant lots	Requires public unpaved roads with AADT ≥ 250 vehicles/day to be controlled by paving, palliatives, gravel, or other approved measure to meet stabilization standards.	1998 PM_{10} FIP[7] (63 FR 41326-41356; August 3, 1998. 64 FR 71308; December 21, 1999)	RACM
1993 SIP for Nogales PM10 Nonattainment	City commits to paving the remainder of unpaved streets within the City limits within 5 years.	1993 PM_{10} SIP[8] (76 FR 1532-1535; January 11,	RACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
Area (Section 4.1) 2012 Nogales PM10 SIP	Requires paving or chemically stabilizing unpaved roads; pave, vegetate or chemically stabilize unpaved access points.	2011) 2012 PM10 SIP (77 FR 58962; September 25, 2012)	
Texas Administrative Code, Title 30, Part 1, Chapter 111, Subchapter A, Division 4, Rule §111.147; Roads, Streets, and Alleys	New alleys in the City of El Paso must be paved; existing alleys shall not be used for residential garbage and recycling pickup.	1991 PM_{10} SIP[9] (59 FR 2532-2541; January 18, 1994).	RACM
Unpaved Parking Lots			
	Measures for unpaved parking lots are discussed under Developed Land – Urban and Developed Land – Rural.		
Construction			
SJVAPCD Rule 8021, Construction, Demolition, Excavation, Extraction, And Other Earthmoving Activities	Rule includes a 20% opacity limit; specifies that a Dust Control Plan must be submitted for areas of 40 acres or larger where earth movement of 2500 cubic yards or more on at least 3 days is intended; compliance with specified measures.	2003 PM_{10} SIP[1] (68 FR 8830-8835; February 26, 2003)	RACM
	Rule includes 20% opacity limit and compliance with specified BACM measures. An owner/operator is required to submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. BACM measures include: limit vehicle speed to 15 mph on uncontrolled unpaved surfaces, access/haul roads, within construction site; cease	(FR Vol. 69, 30006-30036, May 26, 2004) [Rule was amended August 19, 2004.]	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	earthmoving activities when high winds cause visible plumes ≥ 20% opacity; cease outdoor construction, excavation, extraction, and other earthmoving activities that disturb the soil whenever VDE exceed 20% opacity; use of specified trackout devices and immediate removal of carryout and trackout when it extends 50 feet or more from the nearest unpaved surface exit point of a site.		
SCAQMD Rule 403, Fugitive Dust	Rule contains: a prohibition on visible dust plumes crossing property line or ≥ 20% opacity; compliance with specified BACM measures; PM_{10} concentrations must be ≤ 50 $\mu g/m^3$ between upwind and downwind property boundaries; install trackout control device for projects ≥ 5 acres; clean public road when visible trackout ≥ 25 feet and at the end of the work day; Dust Control Plans, signage, and dust control supervisor required for projects ≥ 50 acres.	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005. Updated version approved at 73 FR 12639; March 2008.)	BACM
SCAQMD Rule 403.1, Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Rule requires: monitoring onsite wind speed; stabilizing bulk material piles within 24 hours of placement; compliance with specified BACM for inactive disturbed surfaces; Dust Control Plan required for disturbed areas ≥ 5,000 ft^2.	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005).	BACM
MDAQMD Rule 403.1, Fugitive Dust Control for the Searles Valley Planning Area	Rule requires: Dust Control Plan; staging of construction in specified phases; covering of haul truck transporting bulk materials; removal of trackout on public paved roads.	1995 PM_{10} SIP.[3] (Rule was partially approved and partially disapproved at 74 FR 40750; August13, 2009.)	RACM
ICAPCD Rule 801, Construction and Earthmoving Activities	Rule requires: 20% opacity limit; compliance with specified BACM for earthmoving activities; Dust Control Plan for construction sites of 10 acres or more in size for residential developments or 5 acres or more for non-residential developments; cease dust generating activities for wind gusts greater than or equal to 25 mph. The 20% opacity limit shall not apply when Wind Gusts exceed 25 miles per hour, provided that specified control measures are implemented for each applicable Fugitive Dust source type including: ceasation of dust	2009 PM_{10} SIP[4] (75 FR 39366-39390; July 8, 2010. 78 FR 23677-23683; April 22, 2013)	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	generating activities for a period of one hour after Wind Gusts last exceed the 25 mph threshold. If operations cease for the remainder of the day, stabilization measures must be implemented.		
Clark County Air Quality Regulations Section 94 – Permitting and Dust Control for Construction Activities	A Dust Control Permit is not required for soil disturbing or construction activities less than 0.25 acres, mechanized trenching less than 100 ft in length, or for mechanical demolition of any structure smaller than 1000 ft^2. The Dust Control Permit application for a construction project 10 acres or more in area, for trenching 1 mi or greater, or for structure demolition using implosive or explosive blasting techniques, shall include a detailed supplement to the Dust Mitigation Plan that includes: the project description, the area and schedule of the phases of land disturbance, the Control Measures and the Contingency Measures to be used for all construction activities. The supplement becomes part of the Dust Control Permit as an enforceable permit condition. An application for a Dust Control Permit for a Construction project 50 acres or more in area requires a soils analysis of the entire project to determine silt content and optimum moisture of the sample(s). The application for the Dust Control Permit shall contain the particulate emission potential (PEP) for each soil type identified calculated from the results of the soils analysis and the Silt Content vs. Optimum Moisture Content Chart (figure 2) in the Construction Activities Dust Control Handbook. The choice of Best Management Practices for the Dust Mitigation Plan may be different for each soil type area, if not, the highest PEP identified on the project shall be used. A trained Dust Control Monitor is required for projects greater than or equal to 50 acres. Rule requires ceasation of construction activities when high winds cause dust plumes greater than or equal to 20% opacity; no visible dust plume greater than or equal to 100 yards in	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004). [This action approved the November 16, 2000, versions of Section 94. EPA notes action on subsequent revision (July 1, 2004) will be in a separate rulemaking.]	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	length; clean paved roads when trackout is greater than or equal to 50 feet.		
Maricopa County Rule 310, Fugitive Dust From Dust-Generating Operations	Rule requires: 20% opacity limit; prohibition of visible dust plume (determined by using EPA Reference Method 22) crossing property boundary; ensure that control measures and requirements are implemented during high winds that cause dust emissions to exceed 20% opacity; cease dust generating activities and stabilize any disturbed area when high winds cause dust emissions to exceed 20% opacity; stabilize inactive disturbed surfaces; compliance with specified BACM for affected activities; dust control training required for site superintendents and water truck drivers; trained Dust Control Coordinator required for projects 5 acres or greater of disturbed soil; Dust Control Plan required for projects 0.10 acres or greater of disturbed soil.	1999 PM_{10} SIP[6] (67 FR 48718-48739; July 25, 2002. 75 FR 78167; December 15, 2010.)	BACM
Maricopa County Rule 310.01, Fugitive Dust From Non-Traditional Sources of Fugitive Dust	Clean erosion caused deposition of bulk materials (trackout) onto paved surfaces within 24 hours of the deposits' identification.	1999 PM_{10} SIP[6] (67 FR 48718-48739; July 25, 2002. 75 FR 78167; December 15, 2010)	BACM
Cleared Areas			
SJVAPCD Rule 8051 Open Areas	Requires compliance with specified measures for disturbed surfaces ≥ 3.0 acres that have been inactive for ≥ 7 days Requires water/dust suppressants, vegetation, paving, applying gravel, or applying stabilizers to limit VDE to 20% opacity. Upon evidence of trespass, requires posting of "no trespass" signs or installing barriers to prevent access to area.	2003 PM_{10} SIP[1] (68 FR 8830-8835; February 26, 2003)	RACM
	Compliance with specified BACM and 20% opacity limit for disturbed surfaces. The rule applies to any open area having 0.5 acres or more within urban areas, or 3.0 acres or more within rural areas; and contains at least 1000 square feet of disturbed surface area.	2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004)	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	Whenever open areas are disturbed or vehicles are used in open areas, an owner/operator shall implement one or a combination of specified control measures to comply with the conditions of a stabilized surface at all times and to limit VDE to 20% opacity.		
SCAQMD Rule 403 Fugitive Dust	Requires compliance with specified BACM measures for storage piles and disturbed surface areas. Rule includes 20 percent opacity limit.	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005. Updated version approved at 73 FR 12639; March of 2008.)	BACM
SCAQMD Rule 403.1 Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Requires compliance with specified BACM measures including stabilization of inactive disturbed surface areas within 20 days of activity cessation.	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005)	BACM
MDAQMD Rule 403.2, Fugitive Dust Control for the Mojave Desert Planning Area	Requires stabilization of graded site surfaces when development is delayed, or expected to be delayed for more than 30 days.	1995 PM_{10} SIP[3] (No action on rule)	RACM
ICAPCD Rule 804, Open Areas	Requires compliance with 20% opacity limit and stabilized surface using specified BACM measures. Applicable to to any open area having 0.5 acres or more within urban areas, or 3.0 acres or more within rural areas; and contains at least 1000 square feet of disturbed surface area. Measures include prevention of vehicle trespass by signage or physical barriers.	2009 PM_{10} SIP[4] (75 FR 39366-39390; July 8, 2010. 78 FR 23677-23683; April 22, 2013.)	BACM
Clark County Air Quality Regulations Section 90, Fugitive Dust from Open Areas and Vacant Lots	Requires prevention of vehicle trespass on open areas greater than 5,000 ft^2 within 30 days of initial discovery; application of gravel or palliatives satisfying stabilization standards to all areas disturbed by motor vehicles. Dust Mitigation Plans are required for open areas and vacant lots having	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004. Action approved revised versions of Sect 90 – 93 dated November 20, 2001,	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	a cumulative area greater than or equal to 10,000 ft^2; if machinery is used to clear weeds and/or trash from open areas and vacant lots of 5000 ft2 or greater then specified control measures shall be applied (pre-wet surface soil; maintain dust control measures during activity; and pave, apply gravel, apply water, or apply a palliative in compliance with specified BACM.	which supersede earlier versions.) [Adopted on June 22, 2000. Amended November 16, 2000; November 20, 2001; December 17, 2002; June 3, 2003, July 1, 2004, April 15, 2014.]	
Clark County Air Quality Regulations Section 92, Fugitive Dust from Unpaved Parking Lots and Storage Areas	Rule includes various measures addressing: paving and stabilization of unpaved parking lots (5,000 square feet), material storage and handling areas, and staging areas.	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004)	BACM
Maricopa County Rule 310.01 Fugitive Dust From Non-Traditional Sources of Fugitive Dust	Requires stabilizing open area soils sufficient to meet stabilization standards and prevent visible dust plumes from crossing property boundaries. Rule is applicable to open areas, vacant lots, and unpaved parking lots. Contains specified long-term BACM for open areas and vacant lots that are 0.10 acre or larger. Measures include paving, clean-up of track-out from unpaved parking areas that extends 25 feet or more, and prevention of vehicle trespass by signage or physical barrier.	1999 PM_{10} SIP[6] (67 FR 48718-48739; July 25, 2002. Revised rule approved at 75 FR 78167; December 15, 2010.)	BACM
40 CFR 52.128, Rule for unpaved parking lots, unpaved roads and vacant lots	Rule contains measures addressing: stabilization, re-vegetation, vehicle access restriction, paving, etc. Includes mitigation requirements for public and private unpaved parking lots, urban and suburban vacant lots and disturbed surfaces. Also includes certain exemptions for parking areas (parking lots or open areas/vacant lots disturbed by motor vehicle traffic) less than 5,000 square feet and vacant lots (not disturbed by motor vehicles) with less than 0.5 acre of disturbed surface area.	40 CFR 52.128 (64 FR 71308, December 21, 1999)	RACM
Developed Land – Urban			
Clark County Rule Section 90, Fugitive Dust	Rule contains various measures addressing: stabilization, paving, and vehicle access for open areas greater than 5,000 square feet, additional	2001 PM_{10} SIP[5] (69 FR 32273-32277;	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
from Open Areas and Vacant Lots	dust mitigation plans for owners of open areas and vacant lots with a cumulative area of 10,000 acres or greater, etc.	June 9, 2004. Action approved revised versions of Sect 90 – 93 dated November 20, 2001, which supersede earlier versions.) [Adopted on June 22, 2000. Amended November 16, 2000; November 20, 2001; December 17, 2002; June 3, 2003, July 1, 2004, April 15, 2014.]	
Clark County Rule Section 92, Fugitive Dust from Unpaved Parking Lots and Storage Areas	Rule contains various measures addressing: paving and stabilization of unpaved parking lots (5,000 square feet), material storage and handling areas, and staging areas.	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004)	BACM
40 CFR 52.128, Rule for unpaved parking lots, unpaved roads and vacant lots	Rule contains measures addressing: stabilization, re-vegetation, vehicle access restriction, paving, weed abatement, etc. Includes mitigation requirements for public and private unpaved parking lots, urban and suburban vacant lots and other disturbed surfaces. Also includes certain exemptions for parking areas (parking lots or open areas/vacant lots disturbed by motor vehicle traffic) less than 5,000 square feet and vacant lots (not disturbed by motor vehicles) with less than 0.5 acres of disturbed surface area.	40 CFR 52.128 (64 FR 71308, December 21, 1999)	RACM
Maricopa County Rule 310.01, Fugitive Dust From Non-Traditional Sources of Fugitive Dust	Rule contains various measures addressing open areas, vacant lots, and unpaved parking lots including paving, stabilization, vehicle access restrictions, etc. Includes measures for open areas and vacant lots that are 0.10 acre or larger. The rule also requires clean-up of track-out from unpaved parking areas that extends 25 feet or more.	1999 PM_{10} SIP[6] (67 FR 48718-48739; July 25, 2002. Revised rule approved at 75 FR 78167; December 15, 2010.)	BACM
SCAQMD Rule 403, Fugitive Dust and Rule	Rules include measures addressing storage piles and disturbed surface areas.	1998 South Coast AQMP[2] (70 FR 69081-	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
403.1, Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources		69085; November 14, 2005. Updated version approved at 73 FR 12639; March of 2008.)	
ICAPCD Rule 804, Open Areas	Includes measures addressing: stabilization, re-vegetation, vehicle access (posting, barriers), etc. Applies to 0.5 acres or more within urban areas, or 3.0 acres or more within rural areas.	2009 PM_{10} SIP[4] (75 FR 39366-39390; July 8, 2010. 78 FR 23677-23683; April 22, 2013.)	BACM
SJVAPCD Rule 8051, Open Areas	Contains measures addressing: stabilization, vehicle access, etc.	2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004)	BACM
Developed Land – Rural			
SJVAPCD Rule 8071, Unpaved Vehicle/Equipment Traffic Areas	Fugitive PM_{10} Management Plan and compliance with specified BACM required on unpaved vehicle areas ≥ 1.0 acres that receive ≥ 75 vehicle trips per day. Regulation VIII currently contains a daily trip exemption threshold of 75 for unpaved agricultural roads and for unpaved vehicle and equipment parking and traffic areas which is based on the SJVAPCD Governing Board plan Adoption of the 2003 PM10 Plan, June 19, 2003, however this measure is in Rule 8081(Agricultural Sources), not in Rule 8071.	2003 PM_{10} SIP[1] (68 FR 8830-8835; February 26, 2003)	RACM
	Requires compliance with specified BACM on unpaved vehicle areas receiving ≥ 50 average annual daily trips, to limit visible dust emissions to 20% opacity and meet stabilization requirements. The owner/operator shall comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the specified control measures, or shall implement an APCO approved Fugitive PM10 Management Plan as specified in Rule 8011.	2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004)	BACM
SJAPCD Rule 8051, Open Areas	Contains measures addressing: stabilization, vehicle access, etc.	2003 PM_{10} SIP[1] (69 FR 30006-30036;	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
		May 26, 2004)	
ICAPCD Rule 804, Open Areas	Requires compliance with 20% opacity limit and stabilized surface requirements using specified BACM measures. Measures address: stabilization, re-vegetation, vehicle access (posting, barriers), etc. Applies to 0.5 acres or more within urban areas, or 3.0 acres or more within rural areas.	2009 PM_{10} SIP[4] (75 FR 39366-39390; July 8, 2010. 78 FR 23677-23683; April 22, 2013.)	BACM
SCAQMD Rule 403, Fugitive Dust and Rule 403.1, Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Rules include measures addressing storage piles and disturbed surface areas.	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005. Updated version approved at 73 FR 12639; March of 2008.)	BACM
Clark County Air Quality Regulations Section 90 – Fugitive Dust from Open Areas and Vacant Lots	Includes measures addressing: stabilization, paving, and vehicle access for open areas greater than 5,000 square feet, additional dust mitigation plans for owners of open areas and vacant lots with a cumulative area of 10,000 acres or greater, etc.	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004)	BACM
Clark County Air Quality Regulations Section 92 – Fugitive Dust from Unpaved Parking Lots and Storage Areas	Includes measures addressing: paving and stabilization of unpaved parking lots (5,000 square feet), material storage and handling areas, and staging areas.	2001 PM_{10} SIP[5] (69 FR 32273-32277; June 9, 2004)	BACM
Maricopa County Rule 310.01, Fugitive Dust From Non-Traditional Sources of Fugitive Dust	Contains various measures addressing open areas, vacant lots, and unpaved parking lots including paving, stabilization, vehicle access restrictions, etc. Includes measures for open areas and vacant lots that are 0.10 acre or larger. The rule also requires clean-up of track-out from unpaved parking areas that extends 25 feet or more. Requires prevention of dust plumes from crossing property boundaries or exceeding 20% opacity; silt loading limit of 0.33 oz/ft^2.	1999 PM_{10} SIP[6] (67 FR 48718-48739; July 25, 2002. Revised rule approved at 75 FR 78167; December 15, 2010.)	BACM
40 CFR 52.128, Rule for unpaved parking lots,	Rule contains measures addressing: stabilization, re-vegetation, vehicle access restriction, paving, weed abatement, etc. Includes mitigation	40 CFR 52.128 (64 FR 71308, December 21,	RACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
unpaved roads and vacant lots	requirements for public and private unpaved parking lots, urban and suburban vacant lots and disturbed surfaces. Also includes certain exemptions for parking areas (parking lots or open areas/vacant lots disturbed by motor vehicle traffic) less than 5,000 square feet and vacant lots (not disturbed by motor vehicles) with less than 0.5 acres of disturbed surface area.	1999)	
Desert Shrubland			
MDAQMD Rule 403.1, Fugitive Dust Control for the Searles Valley Planning Area	Rule requires a dust control plan to reduce PM10 emissions by at least 20% relative to 1990 levels on BLM lands. Rule lists items that may be included in the plan.	1995 PM10 SIP.[3] (Rule partially approved and partially disapproved at 74 FR 40750; August 13, 2009.)	RACM
ICAPCD Rule 800, General Requirements for Control of Fine Particulate Matter (PM-10)	Rule includes measures addressing: recreational off-highway vehicle use on Public lands and Dust Control Plan Requirements, etc.	78 FR 23677; April 22, 2013	BACM
Agriculture (Croplands)			
SJVAPCD Rule 4550, Conservation Management Practices	The owner/operator of agricultural operation ≥ 100 acres must prepare and submit a CMP application committing to one CMP for each applicable source category and implement the CMPs upon approval by SJVAPCD of the application. The Air District's rule requires farmers to implement five CMPs for each crop including one from each of the following categories: • Land preparation and cultivation • Harvest activities • Unpaved roads • Unpaved equipment yards • Other cultural practices	2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004)	BACM
SJVAPCD Rule 8081, Agricultural Sources	The owner/operator of an agricultural operation must limit visible dust plumes to 20% opacity through application of specified BACM	2003 PM_{10} SIP[1] (68 FR 8830-8835;	RACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
	alternatives for each of several specified sources.	February 26, 2003)	
		2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004)	BACM
ICAPCD Rule 806, Conservation Management Practices	The owner/operator of an agricultural operation ≥ 40 acres must prepare and submit a CMP Plan committing to one CMP for each applicable source category and implement the CMPs upon approval by ICAPCD of the application. Includes special provisions on acres implementing the Conservation Tillage CMP.	2009 PM_{10} SIP[4] (75 FR 39366-39390; July 8, 2010. 78 FR 23677-23683; April 22, 2013.)	BACM
SCAQMD Rule 403.1, Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Requires any person involved in agricultural tilling or soil mulching activities to cease operations when wind speeds exceed 25 mph (with some exceptions).	1998 South Coast AQMP2 (70 FR 69081-69085; November 14, 2005).	BACM
Confined Animal Feeding Operations (CAFOs)			
SJVAPCD Rule 4570, Confined Animal Facilities	The owner/operator of a beef feedlot holding ≥ 3,500 head must prepare and submit an emission mitigation plan identifying one BACM control for each of two operational phases and for each applicable source category Owners/operators subject to the provisions of the rule are required to submit a Permit to Operate (PTO) application by December 15, 2006, detailing an emission mitigation plan listing all chosen mitigation measures.	2003 PM_{10} SIP[1] (69 FR 30006-30036; May 26, 2004. 77 FR 2228: January 17, 2012.)	BACM
SCAQMD Rule 1186, PM_{10} Emissions from Paved and Unpaved Roads, and Livestock Operations	An owner/operator is prohibited from hay grinding between 2:00 and 5:00 pm each day if visible emissions extend beyond 50 feet from grinder; treat all unpaved access connections and unpaved feed lane access areas with gravel, pavement, or asphaltic road-base.	1998 South Coast AQMP[2] (70 FR 69081-69085; November 14, 2005. New version approved at 77 FR 13495; March 7, 2012, but did not change CAFO portion.	BACM

Exhibit F-I: List of Available Control Measures Relevant to West Pinal County PM_{10} Nonattainment Area Significant Sources			
Control Measure*	Requirements	Applicable SIP (U.S. EPA Approval Citation)	Measure Type
ICAPCD Rule 420, Livestock Feed Yards (Beef Feedlots)	Requires operator to maintain manure between 20% and 40% moisture content in the top 3 inches in occupied pens; manage manure to effectively control dust and to prevent adverse public health conditions. [Rule 420, Beef Feedlots, formerly Livestock Feed Yards adopted 11/19/85; revised 9/14/99, 08/13/2002, and 10/10/2006]	2009 PM_{10} SIP[4] (68 FR 8839; February 26, 2003)	BACM
SCAQMD Rule 403, Fugitive Dust	Requires compliance with specified BACM measures (conservation management practices).	(73 FR 12639; March 2008)	BACM

[1]2003 PM10 Plan, San Joaquin Valley Plan to Attain Federal Standards for Particulate Matter 10 Microns and Smaller, August 19, 2003.
[2]1998 South Coast Air Quality Management District, Air Quality Management Plan.
[3]Final Mojave Desert Planning Area Federal Particulate Matter (PM10) Attainment Plan, July 31, 2005.
[4]2009 Imperial County State Implementation Plan for Particulate Matter Less Than 10 Microns in Aerodynamic Diameter, Final, August 11, 2009.
[5]PM–10 State Implementation Plan for Clark County, July 25, 2001.
[6]Revised Maricopa Association of Governments 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area, February 2000.
[7]Federal Implementation Plan for Arizona – Phoenix Moderate PM_{10} Area at 40 CFR 52.128 (64 FR 71308, December 21, 1999).
[8] Final State Implementation Plan for the Nogales PM10 Nonattainment Area, June 1993.
[9]Texas State Implementation Plan for PM-10 in El Paso, November 5, 1991.

*Air Quality Control Districts Referenced:

- San Joaquin Valley Air Pollution Control District (SJVAPCD), California
- Great Basin Unified Air Pollution Control District (GBUAPCD), California
- South Coast Air Quality Management District (SCAQMD), California
- Coachella Valley, California (Part of the SCAQMD)
- Mojave Desert Air Quality Management District (MDAQMD), California
- Imperial County Air Pollution Control District (ICAPCD), California
- Clark County Department of Air Quality, Nevada
- Maricopa County Air Quality Department, Arizona

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Exhibit F-II – Construction Comparison

Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas

In Exhibit F-II, the Pinal County Construction Rule is compared to applicable BACM requirements adopted for the Imperial County Air Pollution Control District (ICAPCD) in California. For some Pinal County rule sections, comparison is also made with applicable requirements implemented in the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD) in California, and Maricopa County (MC), Arizona.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
Intent and Applicability			
PCCR 4-3-160. General Provisions; Section (A), Intent and Applicability	The intent of the rule is to control dust emissions associated with CONSTRUCTION activities. Applicable in the West Pinal County PM_{10} Moderate Nonattainment area.	Imperial County Rule 801(A): Purpose is to reduce the amount of PM-10 emissions due to Construction and Earthmoving Activities.	Although not specified in the Pinal County applicability section, earthmoving is included as a dust generating activity in definition.
General Prohibition and Exemptions			
PCCR 4-3-160. General Provisions; Section (B) General Prohibition and Exemptions	Prohibits DUST GENERATING OPERATION at any WORK SITE, without complying with the Article.		
	Provides exemptions for: - Other Permits. Provides application and permit requirement exemptions for facilities permitted under ARS §§ 49-426 or 49-480 (State and county permitting programs including CAA Title V compliance). Standards under PCCR 4-3-180(A) and (B) and recordkeeping requirements under 180(C)(2)(b) still apply. - Emergencies (unforeseen events beyond control of	Exemptions included in Imperial County Rule 800 (General Rule): - Flood Control Channels and water spreading basins (Emergency maintenance) [ICAPCD Rule 800(E.3)] - Public Health and Safety (emergency activities less than 30 days) [ICAPCD Rule 800(E.4)] - Endangered Species (Actions required by the Federal or State Endangered Species Act) [ICAPCD Rule 800(E.1)] - Off-Field Agricultural	Air districts primarily incorporate area specific exemptions. Pinal County rule does not include an exemption for "Single Family Residential Construction and Demolition" as in Imperial County rules. Size threshold, however, limits applicability to Work Sites 0.1 acre or larger. Imperial County provides exemption from requirement for 20% opacity when wind exceeds 25mph. Pinal County rule provides similar exemption from violation during high

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	operator, acts of God). Action may be taken to stabilize before submitting permit application. - Vehicle Test Facilities (activities required to test vehicles and equipment) - Road maintenance (application and permit requirements only, standards and record keeping apply) - Emergency Utility Repair (application and permit requirements only) - Landscaping and Sports Fields (without mechanized equipment, no grading or trenching) - Roofing (cutting, drilling, grinding, or coring tile roofing on pitched roofs)	Sources (necessary to minimize adverse effects on crops during freezing temperatures) [ICAPCD Rule 800(E.2)] - Blasting Operations (permitted by the California Division of Industrial Safety) [ICAPCD Rule 800(E.5)] - Military Training Activities (does not apply to unpaved roads, staging areas, parking lots) [ICAPCD Rule 800(E.6)] Exemptions included in Imperial County Rule 801, Construction and Earthmoving Activities: - Single Family Residential Construction and Demolition at existing single family residential dwellings are exempt from construction and earthmoving measures. [ICAPCD Rule 801(D.1)] - Wind Event. 20% opacity limit does not apply when Wind Gusts exceed 25 miles per hour, provided that specified control measures are implemented. [ICAPCD Rule 801(D.2)]	risk events provided all measures are implemented and the area is stabilized. See PCCR 4-3-180(B) and 190. Pinal County rule also provides violation exemption for emergency maintenance of flood control channels and water retension basins at section 4-3-190.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		Exemptions included in Imperial County Rule 802, Bulk Materials: - Outdoor storage, transport, or handling of Bulk Materials (including, but not limited to, organic or inorganic fertilizer, grains, seed, soil amendments, and feed) which would be damaged by wetting with water or by the application of Chemical Stabilization/Suppression, provided owners/operators demonstrate to the satisfaction of the APCO that none of the control measures required by this rule can be implemented to limit VDE to 20% opacity or provide a Stabilized Surface, as defined in Rule 800. [ICAPCD Rule 802(D.1)] - Outdoor storage or handling of any Bulk Material at a single site where no material is actively being added or removed at the end of the workday or overnight and where the total material stored is less than 100 cubic yards. [ICAPCD Rule 802(D.2)] - Transport of a Bulk Material	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		in an outdoor area for a distance of twelve feet or less with the use of a chute or conveyor device. [ICAPCD Rule 802(D.3)] - Transport/hauling of Bulk Materials when conducted within the boundaries of a premises, are exempt from the requirements specified in Sections F.3.a and F.3.d. [ICAPCD Rule 802(D.4)] Exemptions included in Imperial County Rule 803, Carry-Out and Track-Out: - Agricultural Operation Sites defined in and subject to Rule 806, Conservation Management Practices, are exempt from the requirements specified in Sections F.1.b and F.1.c [related to track-out prevention devices, paving, chemical stabilization, and gravel pads at access points where Unpaved Roads adjoin Paved Roads]. [ICAPCD Rule 803(D.1)] - Any operation site that operates no more than 10 days within a 90 days period	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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		at each location is exempt from the requirements specified in Sections F.1.b and F.1.c [related to track-out prevention devices, paving, chemical stabilization, and gravel pads at access points where Unpaved Roads adjoin Paved Roads]. [ICAPCD Rule 803(D.2)]	
Definitions (Selected)			
PCCR 4-3-170. Definitions	See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.		
PCCR 4-3-170(1). "BULK MATERIAL"	"**BULK MATERIAL**" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.	**BULK MATERIAL:** Earth, rock, Silt, sediment, sand, Gravel, soil, fill, Aggregate, dirt, mud, debris, and other organic and/or inorganic material consisting of or containing Particulate Matter with five percent or greater Silt content. For the purpose of this Regulation, the Silt content level is assumed to be 5 percent or greater, unless the Person responsible for the Active Operation conducts the applicable laboratory tests and demonstrate that the Silt content is less than 5 percent. Active Operations seeking to determine if the Silt content is less than five	Imperial County rule includes additional definitions for aggregate and silt.

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		percent are required to conduct the laboratory analysis in accordance with ASTM method C-136-a (Standard Test Method for Sieve analysis of Fine and Coarse Aggregates), or other equivalent test methods approved by EPA, ARB, and the APCD. [ICAPCD Rule 800(C.10)] **AGGREGATE MATERIALS:** Consists of sand, Gravel, quarried stone and/or rock fragments that are typically used in Construction. Aggregates may be natural, artificial or recycled. [ICAPCD Rule 800(C.2)] **SILT:** Any Aggregate Material with a particle size less than 75 micrometers in diameter as measured by a No. 200 sieve as defined in ASTM D-2487 and as tested by ASTM-C-136 or other equivalent test methods approved by EPA, ARB, and the APCD. [ICAPCD Rule 800(C.36)]	
PCCR 4-3-170(2). "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION"	"**BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION**" as used in this Article, means the processing of BULK MATERIALS, including but not limited to, the	Imperial County rule does not include additional definition.	Pinal County rule includes detailed explanation of material handling and transport.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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	loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.		
PCCR 4-3-170(3). "CONSTRUCTION"	"**CONSTRUCTION"** as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.	**CONSTRUCTION:** Any on-site mechanical activities preparatory to or related to the building, alteration, rehabilitation, or demolition of an improvement on real property, including, but not limited to, land clearing, excavation related to construction, land leveling, grading, cut and fill grading, and the erection or demolition of any structure. As used in Regulation VIII, a construction site may encompass several contiguous parcels, or may encompass only a portion of one parcel, depending on the relationship of the property boundaries to the actual construction activities. [ICAPCD Rule 800(C.13)]	Pinal County and Imperial County include similar descriptions.
PCCR 4-3-170(4). "CONTROL MEASURE"	"**CONTROL MEASURE**" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a WORK SITE in order to comply with applicable standards in section 4-3-180. CONTROL MEASURES include but are not limited to:	Requires Best Available Control Measures for Fugitive Dust (PM-10) [ICAPCD Rule 801(F)] Construction and Earthmoving Activities shall comply with the following requirements: [ICAPCD Rule 801(F.1)]	The Pinal and Imperial rules are structured differently. The Imperial County rule specifies controls separately under each dust generating activity. The Pinal County rule lists control strategies in a single list in definitions, to be applied as appropriate to dust generating activities. Additional control measures for specific circumstances

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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			are detailed elsewhere in the rule.
	Watering (pre-wetting): 'Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any DUST GENERATION OPERATION. This will increase the moisture content of the soils and increase stability of the soil.'	**Pre-Activity**: 1. Pre-water site sufficient to limit visible dust emisions (VDE) to 20% opacity, and 2. Phase work to minimize the amount of disturbed surface area at any one time. [ICAPCD Rule 801(F.1.a)]	
	Watering (operational control): 'For DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.'	**During Active Operations**: 1. Apply water or Chemical Stabilization as directed by product manufacturer to limit VDE to 20% opacity, or 2. Construct and maintain wind barriers sufficient to limit VDE to 20% opacity. If utilizing wind barriers, control measure F.1.b.1 above shall be implemented. 3. Apply water or Chemical Stabilization as directed by product manufacturer to unpaved haul/access roads and Unpaved Traffic Areas sufficient to limit VDE to 20% opacity and meet the conditions of a Stabilized Unpaved Road. [ICAPCD Rule 801(F.1.b)] **Temporary Stabilization During Periods of Inactivity**: 1. Restrict vehicular access to the area by fencing or signage; and 2. Apply water or Chemical	Pinal and Imperial rules are structured differently; similar measures.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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		Stabilization, as directed by product manufacturer, sufficient to comply with the conditions of a Stabilized Surface. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a Stabilized Surface area. [ICAPCD Rule 801(F.1.c)]	
	Applying chemical stabilizers or DUST SUPPRESSANTS: 'Apply chemical stabilizers/DUST SUPPRESSANTS to DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS. Effective in areas which are not subject to daily disturbances.'	**During Active Operations**: 1. Apply water or Chemical Stabilization as directed by product manufacturer to limit VDE to 20% opacity, or 2. Construct and maintain wind barriers sufficient to limit VDE to 20% opacity. If utilizing wind barriers, control measure F.1.b.1 above shall be implemented. 3. Apply water or Chemical Stabilization as directed by product manufacturer to unpaved haul/access roads and Unpaved Traffic Areas sufficient to limit VDE to 20% opacity and meet the conditions of a Stabilized Unpaved Road. [ICAPCD Rule 801(F.1.b)] **Temporary Stabilization During Periods of Inactivity**: 1. Restrict vehicular access to the area by fencing or signage; and 2. Apply water or Chemical	Pinal and Imperial rules are structured differently; similar measures.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		Stabilization, as directed by product manufacturer, sufficient to comply with the conditions of a Stabilized Surface. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a Stabilized Surface area. [ICAPCD Rule 801(F.1.c)]	
	Altering load-in/load-out procedures and watering: 'Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.'	Bulk Material handling operations at the site shall comply with Rule 802. [ICAPCD Rule 801(F.1.f)] **Bulk Material handling**: No Person shall cause, suffer, allow or engage in any Bulk Material handling operation including, but not limited to stacking, loading, unloading, conveying and reclaiming of Bulk Material, for industrial or commercial purposes without complying with one or more of the requirements of Section F.1 so as to limit VDE to 20% opacity. [ICAPCD Rule 802(E.1)] **BULK MATERIAL HANDLING/TRANSFER**: [BACM for Fugitive Dust] a. Spray with water prior to handling and/or at points of transfer; or b. Apply and maintain Chemical Stabilization, or	Imperial rule provides exemption for certain bulk material (including, but not limited to, organic or inorganic fertilizer, grains, seed, soil amendments, and feed) and where the total material stored is less than 100 cubic yards. [ICAPCD Rule 802(D.1 and D.2)]

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		c. Protect from wind erosion by sheltering or enclosing the operation and transfer line. [ICAPCD Rule 802(F.1)]	
	Reducing vehicular speeds: 'Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.'	Unpaved Roads and Unpaved Traffic Areas at the site shall comply with Rule 805. [ICAPCD Rule 801(F.1.e)] **Unpaved Haul/Access Roads**: No Person shall cause, suffer or allow the operation, use, or maintenance of any unpaved Haul/Access Road without complying with one or more of the requirements of Section F.1 so as to limit VDE to 20% opacity. [ICAPCD Rule 805(E.1.)] **Unpaved Traffic Areas**: All Persons who cause, suffer or allow the operation, use or maintenance of any Unpaved Traffic Area larger than one (1) acre and with 75 or more Average Vehicle Trips per Day shall comply with one or more of the requirements of Section F.3 and limit VDE to 20% opacity. [ICAPCD Rule 805(E.5)] **UNPAVED ROADS, INCLUDING UNPAVED HAUL AND ACCESS ROADS**: [BACM for Fugitive Dust]	In addition to reducing vehicle speed, all other control measures in the Pinal rule are applicable (as appropriate) to UNPAVED PARKING LOTS, haul/access roads and traffic areas within a WORK SITE. These areas are included in the definition of **DUST GENERATING OPERATION** at Section 4-3-170(6)**.**

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		a. Pave. b. Apply Chemical Stabilization as directed by product manufacturer to control dust on Unpaved Roads. c. Apply and maintain Gravel, recrushed/recycled asphalt or other material of low Silt (<5%) content to a depth of three or more inches. d. Wetting. Apply water one or more times daily e. Permanent road closure f. Restrict unauthorized vehicle access. g. Any other method that effectively limits VDE to 20% opacity and meets the conditions of a Stabilized Unpaved Road. [ICAPCD Rule 805(F.1)] **UNPAVED TRAFFIC AREAS**: [BACM for Fugitive Dust] a. Pave. b. Apply Chemical Stabilization as directed by product manufacturer to control dust on Unpaved Roads. c. Apply and maintain Gravel, recrushed/recycled asphalt or other material of low silt (<5%) content to a depth of three or more inches. d. Wetting. Apply water one or more times daily. [ICAPCD Rule 805(F.3)]	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	Controlling Freeboard and spillage and covering haul vehicles: 'Load all trucks such that the FREEBOARD is not less than three inches; and prevent spillage or loss of BULK MATERIAL from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.'	Material transport of Bulk Material to, from, or around the site shall comply with Rule 802. [ICAPCD Rule 801(F.1.g)] Haul trucks transporting Bulk Material to, from, or around the site shall comply with Rule 802. [ICAPCD Rule 801(F.1.h)] **Material transport**: no Person shall cause, suffer, allow or otherwise engage in the transportation of Bulk Materials for industrial or commercial purposes, without complying with all of the requirements of Section F.3 so as to limit VDE to 20% opacity. [ICAPCD Rule 802(E.3)] **Haul Trucks**: no Person shall cause, suffer, allow or otherwise engage in the use or operation of any Haul Truck, for industrial or commercial purposes, of transporting or storing Bulk Material without complying with all of the requirements of Section F.3 so as to limit VDE to 20% opacity. [ICAPCD Rule 802(E.4)] **MATERIAL TRANSPORT/HAULING**: [BACM for Fugitive Dust]	Imperial rule provides exemption for the transport of Bulk Material for a distance of twelve feet or less with the use of a chute or conveyor device and from requirements specified in Sections F.3.a and F.3.d (covering haul loads and cargo compartment cleaning of haul trucks) when transport is conducted within the boundaries of a premises. [ICAPCD Rule 802(D.3 and D.4)]

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West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		a. Completely cover or enclose all Haul Truck loads of Bulk Material. b. Haul Trucks transporting loads of Aggregate Materials shall not be required to cover their loads if the load, where it contacts the side, front, and back of the cargo container area remains six inches from the upper area of the container area, and if the load does not extend, at its peak, above any part of the upper edge of the cargo container area (As defined in Section 23114 of the California Vehicle Code for both public and private roads). c. The cargo compartment(s) of all Haul Trucks are to be constructed and maintained so that no spillage and loss of Bulk Material can occur from holes or other openings in the cargo compartment's floor, side, and/or tailgate. Seals on any openings used to empty the load including, but not limited to, bottom-dump release gates and tailgates to be properly maintained to prevent the loss of Bulk Material from those areas. d. The cargo compartment of all Haul Trucks is to be cleaned and/or washed at delivery site after removal of Bulk Material. [ICAPCD Rule 802(F.3)]	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	TRACKOUT CONTROL DEVICE: 'Install a TRACKOUT CONTROL DEVICE for WORK SITES 5 acres or larger. When TRACKOUT extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.'	Track Out/Carry Out of Bulk Materials at the site shall be mitigated in compliance with Rule 803. [ICAPCD Rule 801(F.1.d)] **Track Out/Carry Out**: Any Person who causes the deposition of Bulk Material by tracking out or carrying out onto a Paved Road surface shall comply with the requirements of Section F.1, as specified, to prevent or mitigate such deposition. [ICAPCD Rule 803(E.1)] **TRACK OUT/CARRY OUT**: [BACM for Fugitive Dust] F.1.a. Clean up any Bulk Material tracked out or carried out onto a Paved Road on the following time-schedule: (1) Within urban areas, immediately, when Track-Out or Carry-Out extends a cumulative distance of 50 linear feet or more; and (2) At the end of the workday, for all other Track-Out or Carry-Out. F.1.b In addition to F.1.a, all sites with access to a Paved Road and with 150 or more Average Vehicle Trips per Day, or 20 or more Average Vehicle Trips per Day by vehicles with three or more axles shall install	Imperial rule provides exemption from Sections F.1.b and F.1.c (related to track-out prevention devices, paving, chemical stabilization, and gravel pads at access points where Unpaved Roads adjoin Paved Roads) for Agricultural Operations subject to Rule 806, Conservation Management Practices and any operation site that operates no more than 10 days within a 90 days period. [ICAPCD Rule 803(D.1 and D.2)] The Pinal rule requires trackout clean up as soon as practicable when it extends a cumulative distance of 50 feet or more. The Imperial rule requires immediate clean up for 50 or more feet and South Coast 25 feet or more. Both districts require clean up of trackout by the end of the day.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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		one or more Track-Out Prevention Devices or other APCO approved Track-Out control device or wash down system at access points where unpaved traffic surfaces adjoin Paved Roads; or F.1.c In addition to F.1.a, all sites with access to a Paved Road and with 150 or more Average Vehicle Trips per Day, or 20 or more Average Vehicle Trips per Day by vehicles with three or more axles shall apply and maintain paving, Chemical Stabilizeation, or at least 3 inch depth of Gravel (using Gravel or other low Silt (<5%) content material), for a distance of 50 or more consecutive feet at access points where Unpaved Roads adjoin Paved Roads. [ICAPCD Rule 803(F.1)] No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift. [SCAQMD Rule 403(d)(4)]	
	Limit, restrict or reroute MOTOR VEHICLES access to work site: 'Erect signs or install physical	**Temporary Stabilization During Periods of Inactivity:** 1. Restrict vehicular access to the	Pinal and Imperial rules are structured differently; similar measures; Pinal requirement applies

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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	barriers to limit access of WORK SITE.'	area by fencing or signage; and 2. Apply water or Chemical Stabilization, as directed by product manufacturer, sufficient to comply with the conditions of a Stabilized Surface. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a Stabilized Surface area. [ICAPCD Rule 801(F.1.c)]	at all times.
	Other measures as proposed by registrant: 'Specific measures that are adequate to address applicable standards in section 4-3-180 at the WORK SITE. Alternative measures must be approved by the Control Officer and the EPA Administrator.'		The Pinal County rule provides flexibility for alternative measures approved by EPA.
PCCR 4-3-170(5). "DISTURBED SURFACE AREA"	"**DISTURBED SURFACE AREA**" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition. This definition excludes those permanently stabilized areas that have: a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby	DISTURBED SURFACE AREA: An area in which naturally occurring soils, or soils or other materials placed thereon, have been physically moved, uncovered, destabilized, or otherwise modified by grading, land leveling, scraping, cut and fill activities, excavation, bush and timber clearing, or grubbing, and soils on which vehicle traffic and/or equipment operation has occurred. An area is considered to be disturbed until the activity that caused the disturbance has been completed, and the disturbed area meets the	The Imperial County rule is somewhat more specific regarding what constitutes a disturbed surface; the Pinal rule is broader. Both rules exclude stabilized areas.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
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	natural conditions; b. Been paved or otherwise covered by a permanent structure; or c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.	stabilized surface conditions specified in this rule, or the area has been paved or otherwise covered by a permanent structure. [ICAPCD Rule 800(C.15)]	
PCCR 4-3-170(6). "DUST GENERATING OPERATION"	"**DUST GENERATING OPERATION**" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to: a. EARTHMOVING ACTIVITIES b. Land clean-up, leveling, back filling c. Drilling d. CONSTRUCTION e. Demolition f. BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATIONS g. Operation of motorized machinery used in CONSTRUCTION h. Establishing and/or using UNPAVED PARKING LOTS, haul/access roads within a WORK SITE i. Installing initial landscapes using mechanized equipment. For the purpose of this rule, landscape maintenance and/or	Imperial County Rule 800 has a similar definition for ACTIVE OPERATION: Activities capable of generating Fugitive Dust (PM-10), including but are not limited to, Earthmoving Activities, Construction activities, Unpaved Roads, Track-Out/Carry-Out, Bulk Material storage and transport, Unpaved Haul/Access Roads. [ICAPCD Rule 800(C.1)] Applicability section of San Joaquin Rule 8020 identifies the following activities: construction, demolition, excavation, extraction, and water mining related disturbances of soil, including land clearing, grubbing, scraping, ground excavation, land leveling, grading, cut and fill operations, travel on the site, travel on access roads to and from the site, and demolition activities. [SJVAPCD Rule 8020(2)]	The scope of the Pinal County rule is consistent with reviewed BACM level rules.

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	playing on a ball field shall not be considered a dust generating operation.		
PCCR 4-3-170(7). "DUST SUPPRESSANT"	"**DUST SUPPRESSANT**" means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.	San Joachin Rule defines Dust Suppressants as: includes water, hygroscopic materials, chemical stabilization and suppression materials (see also Definition 3.4 "Chemical Stabilization/Suppression"), and other approved substances. [SJVAPCD Rule 8010(3.7)] Chemical Stabilization/Suppression: a means of dust control implemented by any person to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other approved materials. [SJVAPCD Rule 8010(3.4)] Imperial County Construction rules do not explicitly define dust suppressant. Chemical Stabilization/Suppression definition similar to San Joaquin. [ICAPCD Rules 800 and 801]	Pinal County Rule refers primarily to chemical stabilizers. Water is specified separately as a control elsewhere in the rule.
PCCR 4-3-170(8). "EARTHMOVING ACTIVITY"	"**EARTHMOVING ACTIVITY**" means any land clearing, land cutting and filling operations, blasting, trenching, ROAD CONSTRUCTION, grading,	EARTHMOVING ACTIVITIES: The use of any equipment for an activity that may generate Fugitive Dust emissions, including, but not limited to, cutting and filling,	Imperial County rule specifically identifies adding to or removing from storage piles as an earth moving activity whereas the Pinal rule does not. Pinal rule however is broad

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	landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.	grading, leveling, excavation, trenching, loading or unloading of Bulk Materials, demolishing, drilling, adding to or removing bulk materials from open storage piles, weed abatement through disking, and back filling. [ICAPCD Rules 800(C.17)]	enough to include these activites and emissions reduction provisions for these sources are included elsewhere in the rule.
PCCR 4-3-170(17). "PAVED PUBLIC ROADWAY"	"**PAVED PUBLIC ROADWAY**" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either: 1. An on-going maintenance obligation for the roadway; or 2. A title or easement for the roadway.	PAVED ROADS: An improved street, highway, alley, public way, that is covered by concrete, asphaltic concrete, or asphalt. [ICAPCD Rules 800(C.31)]	The Pinal County Rule defines Paved Road as a government owned public roadway, consistent with the Phoenix RACM FIP application of controls for unpaved roadways. [40 CFR 52.128]
PCCR 4-3-170(18). "PINAL COUNTY DUST CONTROL FORECAST"	"**PINAL COUNTY DUST CONTROL FORECAST**" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following: a) Projected meteorological conditions, including: i) Wind speed and direction,	N/A	The Pinal County rule provides an added level of protection by providing a notification system for high risk meteorological events during which additional precautions are required to prevent poor air quality. See also PCCR 4-3-180(B).

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	ii) Stagnation, iii) Recent precipitation, and iv) Potential for precipitation; b) Existing concentrations of air pollution at the time of the forecast; and c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.		
PCCR 4-3-170(21). "STABILIZE"	"**STABILIZE**" means any previously disturbed surface area which, through application of water or DUST SUPPRESSANTS, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).' The Pinal County rule also defines "permanently stabilized areas" under the definition of DISTURBED SURFACE AREA at 4-3-170(5). Permanently stabilized areas have: a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions; b. Been paved or otherwise covered	STABILIZED SURFACE: Any disturbed surface area or open bulk storage pile that is resistant to wind blown Fugitive Dust emissions. A surface is considered to be stabilized if it meets at least one of the following conditions specified in this Section and as determined by the test methods specified in Appendix B, Section A, B and D-G tests of this rule: a. A visible crust; or b. A threshold friction velocity (TFV) for disturbed surface areas corrected for non-erodible elements of 100 centimeters per second or greater; or c. A flat vegetative cover of at least 50 percent that is attached or rooted vegetation; or unattached vegetative debris lying on the surface with a predominant horizontal orientation	The definitions for stabilized surfaces in the Pinal and Imperial County rules are generally consistent. The Pinal rule, however, distinguishes between temporary and permanent forms of stabilization. The Pinal rule requires demonstration of stabilization by application of the drop ball test. This is also a demonstration method contained in the Imperial rule. Although not specified in rule, the Pinal County Control Officer will use the "Line Transect Method" for determining vegetative cover for permanently stabilized areas. The Pinal County construction rule does not contain a separate definition for stabilized unpaved roads as in the Imperial rule. Unpaved roads used

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	by a permanent structure; or c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.	that is not subject to movement by wind; or d. A standing vegetative cover of at least 30 percent that is attached or rooted vegetation with a predominant vertical orientation; or e. A standing vegetative cover that is attached or rooted vegetative with a predominant vertical orientation that is at least 10 percent and where the TFV is at least 43 centimeters per second when corrected for non-erodible elements; or f. A surface that is greater than or equal to 10 percent of non-erodible elements such as rocks, stones, or hard-packed clumps of soil. [ICAPCD Rule 800(C.37)] STABILIZED UNPAVED ROAD: Any Unpaved Road or unpaved vehicle/equipment traffic area surface which meets the definition of Stabilized Surface as determined by the test method in Appendix B, Section C of this rule, and where VDE is limited to 20% opacity. [ICAPCD Rule 800(C.38)]	for construction activities and stabilization of those roads are considered subsumed in the definitions and control requirements for DISTURBED SURFACE AREAS.
PCCR 4-3-170(22). "TRACKOUT"	"**TRACKOUT**" means visible material deposited onto any PAVED PUBLIC ROADWAY, as defined in this Article, by traffic leaving a WORK SITE.	TRACK-OUT/CARRY-OUT: Any and all Bulk Materials that adhere to and agglomerate on the exterior surfaces of motor vehicles and/or equipment (including tires) that may	Similar definition with Imperial County Rule.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		then fall onto the pavement. [ICAPCD Rule 800(C.42)]	
PCCR 4-3-170(25). "UNPAVED HAUL/ACCESS ROAD"	"**UNPAVED HAUL/ACCESS ROAD**" as used in this Article, means any on-site UNPAVED ROAD used by commercial, industrial, institutional, and/or governmental traffic.	UNPAVED ROADS: Streets, alley ways, or roadways that are not covered by one of the following: concrete, asphaltic concrete, asphalt, or other similar materials specified by the U.S.EPA, CARB and/or the APCO. [ICAPCD Rule 800(C.44)]	Pinal County definition is consistent with Appendix C1 of the General Preamble.
PCCR 4-3-170(26). "UNPAVED PARKING LOT"	"**UNPAVED PARKING LOT**" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing MOTOR VEHICLES on a WORK SITE.	UNPAVED TRAFFIC AREA: Any nonresidential area that is: a. Not covered by asphalt, recycled asphalt, asphaltic concrete, concrete, or concrete pavement, and b. Used for fueling and servicing; shipping, receiving and transfer; or parking or storing equipment, haul trucks, vehicles, and any conveyances. [ICAPCD Rule 800(C.45)]	
PCCR 4-3-170(27). "UNPAVED ROAD"	"**UNPAVED ROAD**" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a	UNPAVED ROADS: Streets, alley ways, or roadways that are not covered by one of the following: concrete, asphaltic concrete, asphalt, or other similar materials specified by the U.S.EPA, CARB and/or the APCO. [ICAPCD Rule 800(C.44)]	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.		
PCCR 4-3-170(28). "WORK SITE"	"**WORK SITE**" as used in this Article, means any property upon which DUST GENERATING OPERATIONS occur during CONSTRUCTION, and which covers an area of 0.1 acres or larger. a. TRENCHES that are equal to or larger than the following dimensions are considered WORK SITES and are subject to the requirement of this Article: i. TRENCHES less than four feet in depth, that exceed a length of 726 feet; ii. TRENCHES that are four feet or greater in depth, that exceed a length of 363 feet; b. For calculations of DISTURBED SURFACE AREAS for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a DUST GENERATING OPERATION application is required for the site.	CONSTRUCTION: Any on-site mechanical activities preparatory to or related to the building, alteration, rehabilitation, or demolition of an improvement on real property, including, but not limited to, land clearing, excavation related to construction, land leveling, grading, cut and fill grading, and the erection or demolition of any structure. As used in Regulation VIII, a construction site may encompass several contiguous parcels, or may encompass only a portion of one parcel, depending on the relationship of the property boundaries to the actual construction activities. [ICAPCD Rule 800(C.13)] All Persons who own or operate a Construction site of 10 acres or more in size for residential developments or 5 acres or more for non-residential developments shall develop a dust control plan. The dust control plan shall be made available to the APCD upon request. The dust control plan shall comply with the requirements of Section F. [ICAPCD Rule	This definition defines construction and earthmoving activities subject to controls and establishes the size threshold for control strategies and permits.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	c. If the registrant identifies situations in which the amount of surface area for TRENCHES, land clearing or EARTHMOVING ACTIVITIES should be calculated differently, a case-by-case determination may be made.	801(E.1.c)]	
Standards			
PCCR 4-3-180(A). DUST GENERATING OPERATIONS **Standards**, Application, Permit and Recordkeeping Requirements	Requirements within WORKSITE (0.1 acre or larger) include: - 20% opacity limit for dust on the property. (Test method per PCCR 4-9-340.) [4-3-180(A)(1)] - Stabilize any DISTURBED SURFACE AREA. [4-3-180(A)(2)] - Every other week inspections by OWNER/OPERATOR to ensure that the WORK SITE is STABILIZED. [4-3-180(A)(2)] - Ensure all applicable CONTROL MEASURES [described in CONTROL MEASURE definition at 4-3-170(4)], as specified in the permit, are implemented on DUST GENERATING OPERATIONs and DISTURBED SURFACE AREAs are STABILIZED. [4-3-180(A)(2)]	Requirements for Construction sites and Earthmoving Activities include: - 20% opacity limit [ICAPCD Rule 801(E.1.a) and (E.1.b)] - Comply with the Best Available Control Measure (BACM) requirements of Section F.1 [ICAPCD Rule 801(E.1.a) and (E.1.b)] - Comply with conditions for Stabilized Surface when applicable. [ICAPCD Rule 801(E.1.a) and (E.1.b)]	Both Pinal and Imperial County Rules include 20% opacity limit. Imperial County requires compliance with Best Available Control Measures for Fugitive Dust (PM-10) for Construction and Earthmoving Activities as specified in Section 801(F.1) Subsections a through h. See Control Measure definitions under PCCR 4-3-170(4) for comparison to Pinal County RACM requirements. Pinal County rule contains additional requirement for inspections by the Owner/Operator to ensure stabilization. Imperial County rule does not specify. Imperial rule requires area meet Stabilized Surface conditions when applicable (temporary inactivity, high wind events, etc.). Pinal rule requires that DISTURBED SURFACE AREAs are STABILIZED at all

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
			WORKSITES of 0.1 acres or greater. [PCCR 4-3-180(A)]
PCCR 4-3-180(B). DUST GENERATING OPERATIONS **Standards**, Application, Permit and Recordkeeping Requirements	Where an OWNER/OPERATOR obtains a DUST GENERATING OPERATION permit for a WORKSITE or combination of worksites 5 acres or larger; requires: - **Trackout Control Device**. Installation of suitable TRACKOUT CONTROL DEVICE prior to start of DUST GENERATING OPERATIONs. [4-3-180(B)(1)] - **Temporary Inactivity**. For areas or portions of areas where DUST GENERATING OPERATIONS have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass. [4-3-180(B)(2)] - **Wind Events/High Risk Days**. Ensure WORK SITE is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring	**Trackout Control Device**. Sites with access to a Paved Road and with 150 or more Average Vehicle Trips per Day, or 20 or more Average Vehicle Trips per Day by vehicles with three or more axles: - Install one or more Track-Out Prevention Devices or control device or wash down system at access points with Paved Roads; or - Apply and maintain paving, Chemical Stabilizeation, or at least 3 inch depth of Gravel for a distance of 50 or more consecutive feet at access points. - Operation site that operates no more than 10 days within a 90 days period at each location is exempt. [ICAPCD Rule 803(F)] **Temporary Inactivity**. Temporary Stabilization During Periods of Inactivity: - Restrict vehicular access to the area by fencing or signage; and - Apply water or Chemical	**Trackout Control Device**. In the Pinal County rule a TRACKOUT CONTROL DEVICE is required for all WORKSITES 5 acres or larger. Imperial rule is dependant on vehicle type and Average Vehicle Trips per Day. **Temporary Inactivity**. Both Pinal and Imperial rules require access restriction; Pinal specifies 30 days of inactivity (5 acres), Imperial does not specify. Imperial rule requires 0.5 acre areas unused for seven days or more to meet requirements for a Stabilized Surface area. Pinal rule requires that DISTURBED SURFACE AREAs are STABILIZED at all WORKSITES of 0.1 acres or greater. [PCCR 4-3-180(A)] **Wind Events/High Risk Days**. Imperial County rule exempts area from 20% opacity limit when wind gusts exceed 25 mph provided that specified controls are implemented. Controls include watering once per hour, maintining 12% soil moisture,

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	the WORK SITE is STABILIZED includes a site-wide inspection to ensure either: a. All applicable CONTROL MEASURES [as described in 4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs, and DISTURBED SURFACE AREAS are STABILIZED; or b. All DUST GENERATING OPERATIONs are ceased and DISTURBED SURFACE AREAS are STABILIZED. [4-3-180(B)(3)]	Stabilization. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a Stabilized Surface area. [ICAPCD Rule 801(F.1.c)] **Wind Events/High Risk Days**. When Wind Gusts exceed 25 miles per hour area is exempt from 20% opacity limit provided that at least one of the following is implemented for each applicable Fugitive Dust source type: - Cease dust generating activities for a period of one hour after Wind Gusts last exceed the threshold. If operations cease for the remainder of the day, stabilization measures must be implemented. - Apply water or dust Suppressants once per hour. - Apply water to maintain 12% soil moisture content. - Construct fences 3-5 feet high with 50% or less porosity, and must be done in conjunction with another measure, as above.	ceasing activities for 1 hour after after last wind gust. Pinal rule requires the entire WORK SITE to be stabilized prior to (the day before) and during a high risk event (includes high wind and stagnation events). Rule provides choice to implement all control measures on DUST GENERATING OPERATIONS and DISTURBED SURFACE AREAS or stabilize and cease operations. If any operations continue, must maintain documentation that activity does not contribute to opacity violation. See also PCCR 4-3-190(B). Rule is reliant on the high risk forecast which provides more protection on high risk days when predicted winds may be below a 25 mph threshold (Imperial's threshhold). According to Arizona Revised Statutes (ARS) § 49-424(11), when developing the forecast, the Department is required to evaluate – (a) Projected meteorological conditions for the nonattainment area, including all of the following: (i) Wind speed and direction. (ii) Stagnation.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		[ICAPCD Rule 801(D.2)]	(iii) Recent precipitation. (iv) Potential for precipitation. (b) Existing concentrations of air pollution at the time of the forecast. (c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
Application (Permit)			
PCCR 4-3-180(C). DUST GENERATING OPERATIONS Standards, **Application**, Permit and Recordkeeping Requirements	Prior to engaging in any DUST GENERATING OPERATIONS on a WORK SITE, the OWNER AND/OR OPERATOR shall file a DUST GENERATING OPERATION application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.	All Persons who own or operate a Construction site of 10 acres or more in size for residential developments or 5 acres or more for non-residential developments shall develop a dust control plan. The dust control plan shall be made available to the APCD upon request. The dust control plan shall comply with the requirements of Section F. [ICAPCD Rule 801(E.1.c)] The owner or operator required to develop a dust control plan shall provide written notification to the APCD within 10 days prior to the commencement of any Construction activities via fax or mail. [ICAPCD Rule 801(E.1.d)] South Coast Rule 403 requires additional Dust Control Measures for	Pinal County rule requires an approved permit (and dust control plan) prior to commencing DUST GENERATING OPERATIONS on a WORK SITE. WORK SITE is defined as 0.1 acre or more. The approved permit requirement and relatively low size threshold improve the penetration and effectiveness of the Pinal County rule relative to other districts. Not all districts require an approved permit. Imperial County rule requires the development of a dust control plan for construction of residential developments 10 acres or larger and for construction of non-residential developments 5 acres or larger. Plan is made available to the Control District upon request. Explicit approval prior to activity is

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		Large Operations (50 acres or larger). Requirements include submittal of a "Large Operation Notification" to the "Executive Officer," documentation and recordkeeping. [SCAQMD Rule 403(e)] San Joachin rule requires submittal of a Dust Control Plan prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. Construction activities cannot commence until the Dust Control Plan has been approved. An owner/operator shall provide written notification to the APCO within 10 days prior to the commencement of earthmoving activities. [SJVAPCD Rule 8021(6.3.1)] Maricopa County prohibits operation of dust-generating operations of 0.10 acre (4,356 square feet) or more without first obtaining a permit or permit revision from the Control	not required. South Coast rules require notification for operations 50 acres or larger. Approval of a plan prior to activity is not required. The size threshold in comparable districts that require an approved permit or plan is 5 or 10 acres compared to the Pinal County 0.1 acre threshold. The San Joaquin rule requires submittal and approval of a Dust Control Plan prior to the start of construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		Officer. [MC Rule 310]	
PCCR 4-3-180(C)(1). DUST GENERATING OPERATIONS Standards, **Application**, Permit and Recordkeeping Requirements	DUST GENERATING OPERATIONS Application Form requirements include: - Separate application for noncontiguous areas. - Subscribe to the Pinal County Dust Control Forecast as part of the permit application process. - A plot plan with total area to be disturbed and indication of the sources of fugitive dust emissions. - Explanation of how the applicant will demonstrate compliance by selection of at least one CONTROL MEASURE for each DUST GENERATING OPERATION. Annual Area Block Application is available to political subdivisions, Public Utility Corporations, and contractors or subcontractors for Political subdivisions or Public Utility Corporations for: - Maintenance of existing underground or above-ground lines. - Effecting end-user connections, including but	Dust control plan requirements include: - A plot plan with type and location of each project. - Total area of land surface to be disturbed, estimated daily throughput volume of earthmoving in cubic yards, and total area in acres of the entire project site. - Expected start and completion dates of dust generating and soil disturbance activities. - The actual and potential sources of Fugitive Dust emissions and the location of Bulk Material handling and storage areas, Paved and Unpaved Roads, entrances and exits where Track Out/Carry Out may occur, and Unpaved Traffic Areas. - Dust Suppressants to be applied, including: product specifications; manufacturer's usage instructions (method, frequency, and intensity of application); type, number, and capacity of application equipment; and information	The information contained in the Pinal County permit application and the Imperial County dust control plan are generally consistent. Pinal rule includes provisions for an Annual Area Block Application (available to political subdivisions, Public Utility Corporations, and contractors or subcontractors for Political subdivisions or Public Utility Corporations) for infrastructure projects.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections. - Underground utility line extensions not exceeding 500' in length. - Overhead utility line extensions. - Expansion or extension of paved roads, UNPAVED ROADS, road shoulders, and/or alleys and public right of ways at non-contiguous sites. Annual block application: - The OWNER AND/OR OPERATOR may submit to the Control Officer one DUST GENERATING OPERATION application for more than one DUST GENERATING OPERATION at which CONSTRUCTION will commence within 12 months of permit issuance. - Must include all the requirements listed for the DUST GENERATING	on environmental impacts and approvals or certifications related to appropriate and safe use for ground application. - Specific surface treatment(s) and/or control measures utilized to control Track Out/Carry Out, and sedimentation where unpaved and/or access points join paved public access roads. - Description of Fugitive Dust control measures to be implemented before, during, and after any dust generating activity. [ICAPCD Rule 801(F.2.c)]	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	OPERATIONS Application. [4-3-180(C)(1)(a) through (d)] - Adhere to the requirements of all current permits issued to the WORK SITE. - For any project not listed in the DUST GENERATING OPERATION Annual Block Application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the DUST GENERATING OPERATION. Such notification must include the site location, size, and type of DUST GENERATING OPERATION, selected control measures, and start date.		
Permit and Recordkeeping Requirements			
PCCR 4-3-180(C)(2). DUST GENERATING OPERATIONS Standards, Application, **Permit and Recordkeeping Requirements**	The signed DUST GENERATING OPERATION permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary CONTROL MEASURES specific to the applicable project as proposed by the registrant.	Imperial County Rule recordkeeping requirements include: - Retain a copy of the dust control plan at the project site. [ICAPCD Rule 801(F.2.a)] - Comply with the requirements of the approved dust control plan. [ICAPCD Rule 801(F.2.b)] - Compile and retain records that	The Pinal County permit is valid for only one year and thereafter must be renewed. Special provisions are included for sites 5 acres or larger. Imperial County rule requires a dust control plan but no explicit permit approval or expiration date.

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	The signature of the OWNER AND/OR OPERATOR on the DUST GENERATING OPERATION permit form constitutes agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable CONTROL MEASURES are implemented throughout the WORK SITE, at all times that DUST GENERATING OPERATIONS are being performed and during the duration of the project. Recordkeeping requirements include: - Maintain a copy of the signed permit and provide it upon request. - Keep records of every other week inspections and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions including any necessary corrective actions. - Demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, 4-3-180 sections (A)(2) and (B)(3) [inspection and stabilization requirements for high risk and non-high risk	provide evidence of control measure application (i.e., receipts and/or purchase records). Describe, in the records, the type of treatment or control measure, extent of coverage, and date applied. For control measures which require multiple daily applications, recording the frequency of application will fulfill the recordkeeping requirements of this rule (i.e., water being applied three times a day and the date). [ICAPCD Rule 801(G)] - Records shall be maintained and be readily accessible for two years after the date of each entry and shall be provided to the APCD upon request. [ICAPCD Rule 801(G)]	

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	days]. - Upon verbal or written request by the Control Officer, inspection records shall be provided no later than 72 hours, excluding weekends. If the Control Officer is at the WORK SITE where the requested records are kept, the records shall be provided without delay. - Records of inspections or a summary report of the records of inspections shall be submitted within 30 days following the termination or expiration of the permit. - Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project. - Notify Control Officer as soon as practicable, but no later than 30 days, of the completion of the project. Permit Renewal Requirements:. - The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the		

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	date of issue. - If the project has not been completed at the end of the one-year period, the permit must be renewed. - The OWNER AND/OR OPERATOR shall reapply for a DUST GENERATING OPERATION permit prior to the expiration date of the original permit. - Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. - Upon renewal, the total acreage covered by the DUST GENERATING OPERATION permit does not have to be contiguous, although all acreage covered by the renewed DUST GENERATING OPERATION permit must have been included in the original DUST GENERATING OPERATION permit. Requirements for sites five acres or larger:		

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	- Erect a project information sign at the main entrance that is visible to the public or at each end of the ROAD CONSTRUCTION project site. - Sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high. - Sign shall contain the following information; Project Name; Name and phone number of person(s) responsible for conducting project; Pinal County Air Quality Control District phone number.		
Violations			
PCCR 4-3-190. Violations	A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation. B. Violation Exemptions: If all records were maintained in accordance with 4-3-180 section (C)(2)(b), the provisions of section 4-3-180 (A)(1) shall not apply to a	Failure to comply with any provisions of this rule shall constitute a violation of Regulation VIII. [ICAPCD Rule 801(H)] Wind Event. 20% opacity limit does not apply when Wind Gusts exceed 25 miles per hour, provided that specified control measures are implemented. [ICAPCD Rule	Imperial County provides exemption from requirement for 20% opacity when wind exceeds 25mph. Pinal County rule provides similar exemption from violation during wind events provided all measures are implemented and the area is stabilized. See also PCCR 4-3-160 and 180(B).

Exhibit F-II: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 3, Construction Sites – Fugitive Dust, to Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	WORK SITE during: 1. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements of 4-3-180 (A)(1), if all CONTROL MEASURES as specified in the permit, are implemented, applied and maintained, all DISTURBED SURFACE AREAs are STABILIZED, and one of the following: a. All DUST GENERATING OPERATIONs are ceased until the opacity requirements of 4-30180(A)(1) no longer being exceeded; or b. Maintain documentation that any DUST GENERATING OPERATIONs that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer. 2. EMERGENCY maintenance of flood control channels and water retention basins if all CONTROL MEASURES, as specified in the permit are implemented, applied, and maintained.	801(D.2)]	

Exhibit F-III – Agriculture Comparison

Comparison of Pinal County PM Nonattainment Area Agricultural Best Management Practices Rules (A.A.C. R18-2-610 & 610.03; A.A.C. R18-2-611 and 611.03; and A.A.C. R18-2-612 and 612.01) to Measures Adopted in Other Areas

FIII-1 Crop Operations Overarching

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
Purpose	To reduce PM dust generation from commercial farming activities in West Pinal County.		To reduce the amount of PM-10 "generated from Agricultural Operation Sites" of forty acres or more.	.	To limit fugitive dust from agricultural operation sites through use of Conservation Management Practice Plans. (Rule 4550)
Farm Activity/ Source Definitions	"Commercial farmer" means an individual, entity, or joint operation in general control of a "Commercial farm." "Commercial farm." means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Maricopa PM -nonattainment area and Maricopa County portion of Area A, or the Pinal County PM Nonattainment Area. meaning 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Maricopa PM nonattainment area and Maricopa County portion of Area A, or the Pinal County PM Nonattainment Area. "Commercial farm road" means a road that is unpaved, owned by a commercial farmer, and is used exclusively to service a commercial farm. "Tillage" means any mechanical practice that physically disturbs the soil, and includes preparation for planting, such as plowing, ripping, or discing. "Cropland" means land on a commercial farm that: a. Is within the time-frame of final harvest to plant emergence, but does not include tillage activities; b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or c. Is a turn-row. "Ground operation" means an agricultural		AGRICULTURAL OPERATIONS: The growing and harvesting of crops for the primary purpose of earning a living. AGRICULTURAL OPERATION SITE: One or more agricultural parcels that meet the following: a Are under the same or common ownership or operation, or which are owned or operated by entities which are under common control; and b Are located on one or more contiguous or adjacent properties wholly within Imperial County. AGRICULTURAL PARCEL: A portion of real property used by an owner or operator for carrying out a specific agricultural operation. Roads, vehicle/equipment traffic areas, and facilities, on or adjacent to the cropland are part of the agricultural parcel (The rule only applies to Agricultural Operation Site of forty (40) acres or more in size)		"Agricultural operation site" is one or more agriculture parcels that are both under the same or common ownership or operation or common control and are located on one or more contiguous or adjacent properties wholly within the San Joaquin Valley Air Basin Agricultural Operations: the growing and harvesting of crops or the raising of fowl or animals, for the primary purpose of earning a living, or of conducting agricultural research or instruction by an educational institution. Agricultural Parcel: a portion of real property, including, but not limited to, cropland, and animal feeding operation (AFO) used by an owner/operator for carrying out a specific agricultural operation. Roads, vehicle/equipment traffic areas, and facilities, on or adjacent to the cropland or AFO are part of the agricultural parcel. (This rule only applies to Agricultural operations sites where total acerage of all parcels is 100 acres or more or parcels above 3000 or more feet above sea level)

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
	operation that is not a tillage operation, which involves equipment passing across the field. A ground operation includes harvest activities. A pass through the field may be a subset of a ground operation. "Harvest" means the time after planting up through harvest, including gathering mature crops from a commercial farm, as well as all actions taken immediately after crop removal, such as cooling, sorting, cleaning, and packing. "Noncropland" means any commercial farm land that: a. Is no longer used for agricultural production; b. Is no longer suitable for production of crops; c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or d. Includes a ditch, ditch bank, equipment yard, storage yard, or well head. "Commercial farm road" means a road that is unpaved, owned by a commercial farmer, and is used exclusively to service a commercial farm.				
Basic Program Structure	Commercial farmer must complete a (feeless) agricultural PM permit record form (essentially a general permit) demonstrating compliance with the applicable rules. A commercial farmer must (1) choose a BMP to implement for Significant Agricultural Earth Moving Activities, (2) must implement at least one BMP from each applicable BMP lists for the categorical activity or source of emissions (e.g. tillage or commercial farm roads), unless exemptions apply, and (3) apply a BMP for high risk dust control forecast days, unless an exemption applies.	"Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following: a)Projected meteorological	Reduce PM by requiring Agricultural Operation Site of forty (40) acres or more in size to implement practices in each Agricultural parcel at least one Conservation Management Practice from each of the following to prevent, reduce, or mitigate PM-10. D.1.a Land preparation and cultivation, CMPs in Section E.1; * D.1.b Harvest activities, CMPs in section E.2; * D.1.c Unpaved Roads, CMPs in Section E.3; D.1.d Unpaved Traffic Areas, CMPs in Section E.4; D.1.e Cropland-Other, CMPs in Section E.5; and *		An owner/operator shall prepare and submit a CMP Application for each agricultural operation site, pursuant to Section 6.0, to the APCO for approval. A CMP Application approved by the APCO shall constitute a CMP Plan. An owner/operator shall implement the applicable selected CMPs for each agricultural operation site. Owner/operator shall submit a CMP application if any operational, administrative or other modification necessitates a revision of the CMP Plan.

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
	The commercial farmer will submit a survey every three years to update logistical information and BMP choices. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer. The commercial farmer will maintain records demonstrating compliance with permit record form.	conditions, including: i) Wind speed and direction, ii) Stagnation, iii) Recent precipitation, and iv) Potential for precipitation; b) Existing concentrations of air pollution at the time of the forecast; and c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast. **NOTE:** Arizona may have a high risk forecast day with very low wind speeds, far below what other states may consider high wind speeds, but existing concentrations or arid conditions may call for a high risk forecast nonetheless.	D.1.f Windblown Dust Control, CMPs in Section E.6. * see exceptions below. Persons may choose the same CMP for D.1.c and D.1.d since they apply to different land, but must choose a unique and individual CMP for each of D.1.a, D.1.b, D.1.e and D.1.f (unless using Conservation Tillage CMP) since they apply to the same land. Agricultural unpaved roads and unpaved equipment or traffic areas with certain thresholds of vehicle daily trips must meet respective specific stabilization and opacity requirements. To Implement the CMPs, the owner or operator shall prepare a CMP Plan for each Agricultural Operation Site. The plan, along with records supporting implementation and technical evaluations for alternative CMPs		
Overarching BMPs for all commercial farmers	When conducting "Significant Agricultural Earth Moving Activities" a commercial farmer shall implement at least one of the following BMPs: a. Apply water prior to such activities and/or time conducting such activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method,	"Significant Agricultural Earth Moving Activities" means either leveling activities conducted on a commercial farm that disturb the soil more than 4 inches below the surface, or the creation, maintenance and	See above.		n/a

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
	amended through April 1998 (and no future editions); b. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions); c. Limit activities on a high risk forecast day for PM; or d. Conduct such activities in a manner to reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.	relocation of: ditches, canals, ponds, irrigation lines, tailwater recovery systems (agricultural sumps) and other water conveyances, not to include activities performed on cropland for tillage, ground operations or harvest. "Ground operation" definition is above in farm activity definitions.			
Categorical BMP Exceptions/Exemptions	If, for the tillage category, a commercial farmer implements the Conservation tillage or Reduced tillage system best management practice, the farmer does not have to implement a best management practice for either "Ground Operations and Harvest" or "Cropland." Also, A person may develop different BMPs from those listed in the rule and may submit such practices that are prove4n effective through on-farm demonstration trials to the [Agricultural Best Management Practices] Committee…[but] the newly developed BMPs are not effective unless submitted as described in A.R.S. §49-457(L) which states: L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.		Persons who own or operate an Agricultural Operation Site of 40 acres or more shall choose at least one of the Conservation Management Practices from each of D.1.a through D.1.f. **unless they implement the Conservation Tillage CMP**. On acres implementing the Conservation Tillage CMP, persons do not need to select additional measures for D.1.a, D.1.b or D.1.e, (land prep and cultivation, harvest, or cropland categories)but do need to implement at least one CMP each from D.1.c, D.1.d and D.1.f (unpaved roads, unpaved traffic areas, and windblown dust control) Also, The owner or operator of an Agricultural Operation Site may develop alternative CMPs. The owner or operator shall submit to the APCD a technical evaluation of the alternative CMPs, demonstrating that the alternative CMP achieves PM-10 emission reductions that are at least equivalent to the most effective CMPs available for the applicable operation (e.g., by eliminated equivalent passes or operations). The APCD will review the technical evaluation, and the alternative CMP must receive approval by the APCD before being included in the CMP Plan.	CONSERVATION TILLAGE (e.g.: no tillage, minimum tillage): A tillage system that reduces a minimum of three tillage operations. This system reduces soil and water loss by reducing the number of passes and by leaving crop residue on the field after harvest as well as managing the residue so that it remains intact during the planting season. It reduces the number of passes and amount of soil disturbance. It improves soil because it retains plant residue and increases organic	Exemptions: The provisions of this rule, except for the recordkeeping provisions of Section 6.5.2, shall not apply to any of the following sources: 4.1.1 Agricultural operation site where the total acreage of all agricultural parcels is less than 100 acres excluding the AFO and exempted lands pursuant to Section 4.1.2 thru Section 4.1.5. 4.1.2 Woodland and wasteland not actually under cultivation or used for pasture. 4.1.3 Land placed in the Conservation Reserve Program meeting the definition and criteria set by the NRCS. 4.1.4 Agricultural parcel that are 3000 feet or more above mean sea level. 4.1.5 Agricultural operation parcel used for the purpose of: 4.1.5.1 Propagating young trees, shrubs, and other miscellaneous crops for transplanting, and exhibiting plants under controlled conditions inside a building with walls and roof, or

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	West Pinal County	Comments/Explanatory Definitions re: West Pinal	Imperial (Rule 806)	Comments/ Explanatory Definitions re: Imperial	San Joaquin (Rule 4550)
				matter.	4.1.5.2 Providing grazing rangeland or pasture, or 4.1.5.3 Forestry, including but not limited to timber harvest operations, silvicultural practices, forest management burning, or forest protection practices. Exceptions: An owner/operator shall select one (1) CMP from the list for each category for each agricultural parcel, except:: 6.2.1 If an agricultural operation site or agricultural parcel has crop rotation, an owner/operator shall select one (1) CMP from the CMP list for each of the applicable CMP categories for each rotated crop type. 6.2.2 If a CMP can only be selected for implementation on a portion of an agricultural operation site, an owner/operator shall select an additional CMP within the CMP category to be implemented on the remaining acreage or remaining AFO. 6.2.3 An owner/operator may select a substitute CMP from another CMP category when no feasible CMP can be identified from one category. This provision shall not apply for the unpaved road, and unpaved vehicle/equipment traffic area CMP categories. 6.2.3.1 An owner/operator may identify or develop a new CMP not on the CMP list to be used to comply with the requirements of this rule. Prior to use of the new CMP the owner/operator must obtain the interim approval of the APCO to use a new CMP to meet the requirements of Section 6.2. The owner/operator shall demonstrate that the new CMP achieves PM10 emission reductions that are at least equivalent to other CMPs on the CMP list that could be selected for the applicable operation.

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
					6.2.3.2 The APCO will perform an independent analysis of proposed CMPs to determine that they achieve PM10 emission reductions that are at least equivalent to other CMPs on the CMP list….This analysis shall be made using the most recent emission factors provided by EPA or CARB when available… 6.2.3.3 An owner/operator may satisfy the requirements of Rule 8081 by implementing CMPs for the unpaved road and unpaved vehicle/equipment traffic area CMP categories that are equivalent to the control measures specified in Rule 8081. (Rule 4550)
BMP General Permit Record Form	Beginning December of 2015, a commercial farmer who engages in a regulated activity shall complete a Best Management Practices Program General Permit Record Form every year. The form shall include the following information: 1. The name of the commercial farmer, signature, and date signed; 2. The mailing address or physical address of the commercial farm; and 3. The best management practices selected for tillage, ground operations and harvest, cropland, noncropland, commercial farm roads, and significant earth moving activities (if applicable); and 4. Any additional best management practices selected for high risk days as predicted by the Pinal County Dust Control Forecast. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.		The owner or operator shall prepare a CMP Plan for each Agricultural Operation Site. The CMP Plan shall be made available to the APCD upon request. The CMP Plan shall be provided to the APCD within 72 hours of notice to the owner or operator. Each CMP Plan shall include, but is not limited to, the following information: F.1 The name, business address, and telephone number of the owner or operator responsible for the preparation and implementation of the CMP Plan. F.2 The signature of the owner or operator and the date that the CPM Plan was signed. F.3 The location of the Agricultural Operation Site: cross roads; canal and gate number. F.4 <u>The crop grown at each location</u> covered by the CMP Plan, total acreage for each crop, the length (miles) of unpaved roads, and the total area (acres or square feet) of the unpaved equipment and traffic areas to be covered by the CMP Plan F.5 The CMPs being implemented for each crop, unpaved road, unpaved equipment and traffic area, and windblown dust control. The CMPs implemented should be described		An owner/operator shall prepare and submit a CMP Application for each agricultural operation site, pursuant to Section 6.0, to the APCO for approval. A CMP Application approved by the APCO shall constitute a CMP Plan. Owner/operator shall keep records of CMP implementation and a permit application copy.

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Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
			to verify that implementation is consistent with the CMP definitions in this rule. F.6 Other relevant information as determined by the APCD.		
BMP Survey (A.A.C. R18-2-611.03(D)(1)(a)-(m))	Beginning in 2017 and at least every three years thereafter, the commercial farmer shall complete a Best Management Practices Program 3-year Survey with data from the preceding calendar year. The survey will include the following information: 1. The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices; 2. The signature of the commercial farmer and the date the form was signed; 3. The acreage of each crop type planted/growing during the calendar year that the survey is conducted; 4. The total miles of commercial farm roads at the commercial farm; 5. The total acreage of the noncropland at the commercial farm; 6. The best management practices selected for tillage, ground operations and harvest, cropland, noncropland, commercial farm roads, and significant earth moving activities (if applicable); and 7. Any additional best management practices selected for high risk days as predicted by the Pinal County Dust Control Forecast.		Only CMP plan.		A CMP Application approved by the APCO shall constitute a CMP Plan. Within 60 days of any operational, administrative, or other modification that necessitates the revision of the CMP Plan. A modification includes, but is not limited to, the following: 6.3.4.1 Administrative changes to any information provided pursuant to Section 6.0, 6.3.4.2 Implementation of a CMP other than the CMP listed in a CMP Plan, 6.3.4.3 Change of the crop or AFO on a agricultural parcel, and 6.3.4.4 Any other changes as determined by the APCO.
Maintaining Records & Compliance	A commercial farmer shall maintain records demonstrating compliance with the applicable rules for <u>three years</u>. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be		Violations - Failure to comply with any provisions of this rule shall constitute a violation of Regulation VIII. Failure to comply with the provisions of a CMP Plan shall also constitute a violation of Regulation VIII. Record of Control Implementation - Any Person subject to the requirements of this rule shall maintain a copy of the		6.5.1. An owner/operator subject to Section 5.0 shall maintain the following records for a minimum of five (5) years: 6.5.1.1 A copy of each CMP Application and CMP Plan. 6.5.1.2 Supporting information necessary

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Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550)**
	kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer. ADEQ shall document noncompliance with the applicable rules before issuing a compliance orders. A commercial farmer who is not in compliance with the applicable rules is subject to the provisions in A.R.S. § 49-457(I), (J), and (K)		CMP Plan and any supporting documentation necessary to confirm implementation of the CMPs. The owner or operator shall prepare a CMP Plan for each Agricultural Operation Site. The CMP Plan shall be made available to the APCD upon request. The CMP Plan shall be provided to the APCD within 72 hours of notice to the owner or operator. An owner or operator implementing alterative CMPs shall maintain a copy of technical evaluation for alternative CMPs and documentation of APCD approval of alternative CMPs. Records shall be maintained for two years after the date of each entry and shall be provided to the APCD upon request.		6.5.2 An owner/operator claiming exemption pursuant to Section 4.0 (agricultural operations listed in the BMP section above)) shall maintain records for a minimum of five (5) years that demonstrate that the agricultural operation site or agricultural parcel qualified for the exemption.

FIII-2 Tillage

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Tillage Farm Practice Category					
Overarching Program Element/Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMPs	A commercial farmer shall implement at least one of the following: – Combining tractor operations, – Equipment modification, – Multi-year crop, – Cessation of night tilling, – Planting based on soil moisture, – Precision farming, – Tillage based on soil moisture, – Timing of a tillage operation, – Transgenic crops, – Transplanting, – Reduced tillage system, or* – Conservation tillage.* *See exceptions in the overarching program elements section	Combining Tractor Operations has basically the same definitions as Imperial's combined operations definitions. However, if Equipment modification is also chosen as a BMP, and uses the same practices as in Combining Tractor Operations BMP, this action is considered one BMP. Equipment modification" means reducing PM~~10~~ emissions and soil erosion during tillage or ground operations by modifying and maintaining an existing piece of agricultural equipment, installing shielding equipment, modifying land planting and land leveling, matching the equipment to row spacing, or grafting to new varieties or technological improvements. If combining tractor operations is also chosen as a BMP, and uses the same practices as described in this BMP, this action is considered one BMP. ADEQ's compliance section will be ensuring that if a farmer is tilling a multi-year crop one year, then	The owner or operator of an Agricultural Operation Site shall implement at least one of the following CMPs in each Agricultural Parcel <u>to reduce PM10 emissions from land preparation and cultivation</u> (CMP Category D.1.a). If the owner or operator selects "Fallow Land" as its CMP, the owner/operator must comply with section E.6 of this rule. E.1.a Alternative Tilling, E.1.b Bed/Row Size Spacing, E.1.c Chemigation/Fertigation, E.1.d Combined Operations, E.1.e Conservation Irrigation, E.1.f Cover Crops, E.1.g Equipment Changes/Technological Improvements, E.1.h Fallow Land, E.1.i Integrated Pest Control, E.1.j Mulching, E.1.k Night Farming, E.1.l Non Tillage /Chemical Tillage, E.1.m Organic Pesticides, E.1.n Precision Farming (GPS), or E.1.o Transgenic Crops		**Alternate Till -** Rotate tillage leaving residue on Soil **Bed-row size or spacing-** Increase or decrease the size of the planting area bed (can be done for field and permanent crops) **Chemigation/Fertigation-** Application of chemicals thru an irrigation system **Combined operations-** To combine equipment, to perform several operations during one pass **Conservation irrigation-** To conserve the quantity of water use, e.g.: drip, sprinkler, buried/underground line **Conservation tillage (e.g.:no tillage, minimum tillage)-** Types of tillage that reduce loss of soil and water in comparison to conventional tillage **Cover crops-** Use seeding or natural vegetation/regrowth of plants to cover soil surface **Equipment changes/Technological improvements-** To modify the equipment such as combines, cotton pickers, tilling and harvesting equipment, increase equipment size, modify land planing and land leveling, matching the equipment to row spacing, grafting to new varieties or technological improvements **Fallowing land -** temporary or permanent removal from production. (e.g.: vineyard pullout, Raisin Industry Diversion program, wildlife/wetlands conservation program) **Floor management -** Smoothing and flattening the soil surface after nut harvest to remove post-harvest residue; maintain clean, smooth, firm floor throughout season by elimination of disking **Integrated Pest Management -** A decision process which uses a combination of techniques including organic, conventional, biological farming practices to suppress pests problems **Mulching -** Applying or leaving plant residue or other material to soil surface **Night farming-** Operate at night where practical when moisture levels are higher and winds are lighter

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Tillage Farm Practice Category					
Overarching Program Element/Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
		they must implement a tillage bmp, the farmer must be actually complying with the rule. It is common sense that if farmer is tilling a multi-year crop, he/she is conducting a dust generating activity that falls under the tilling category. One can only claim a multi-year crop as a BMP if he/she is not tilling.			**Non tillage / Chemical Tillage -** Use flail mower, low volume sprayers, use heat delivery system (as harvest preconditioner) **Organic Practices -** Use biological control methods, use non-chemical control methods **Precision farming (GPS) -** e.g.: GPS, using satellite navigation to calculate position in the field, therefore manage/treat selective area **Time of planting -** To modify the time of planting **Transgenic crops -** Use of GMO or Transgenic crops **Transplanting -** Planting plants already in a growth state
Additional Requirements for High Risk Forecast Days	Unless choosing "limited tillage activity", a commercial farmer shall ensure implementation of at least one of the following on the day before and during a high risk forecast day: – Multi-year crop, – Planting based on soil moisture, – Tillage based on soil moisture, – Reduced tillage system, or – Conservation tillage.	Need definitions here "Limited tillage activity " means performing no tillage operations on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation. Note that "limited tillage activity" is only implemented the day of a high risk forecast.	For windblown dust control (CMP Category D.1.f), the owner or operator of an agricultural operation site shall implement E.6.1. In addition to following E.6.1, if the owner or operator of an Agricultural Operation Site has fields that are in between crops or more permanently fallow, the owner or operator shall implement at least one of the CMPs in E.6.2. E.6.1 When preparing a field for planting, minimize the time that newly tilled soil is smooth and dry by leaving the field surface with large clods for as long as possible and bedding and planting the field as soon as possible once it no longer has large clods. E.6.2 For fields that are in between crops or are permanently fallow, the owner shall implement at least one of the CMPs below: E.6.2a Cover Crop E.6.2b Conservation Tillage E.6.2c Crop Residue Management E.6.2d Cross Wind Stripcropping E.6.2e Field Windbreaks E.6.2f Ridge Roughness E.6.2g Surface Roughening E.6.2h Wind Barrier	Imperial does not have a similar high wind forecast day.	n/a

FIII-3 Ground Operations and Harvest

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Ground Operations and Harvest					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMPs	A commercial farmer shall implement at least one of the following: – Combining tractor operations, – Equipment modification, – Chemical irrigation, – Green chop, – Integrated pest management, – Multi-year crop, – Precision farming, – Reduced harvest activity, – Transgenic crops, or – Shuttle System/Larger Carrier.	(NOTE that none of the BMPs for Ground Operations and Harvest are required if the farmer implements conservation or reduced tillage for the tillage category—see exceptions in the overarching program elements section.)	The owner or operator of an Agricultural Operation Site shall implement at least one of the following CMPs in each Agricultural Parcel to reduce PM10 emissions from harvest activities (CMP Category D.1.b). If the owner or operator selects "Fallow Land" as its CMP, the owner/operator must comply with Section E.6 of this rule. E.2.a Baling /Large Bales E.2.b Combined Operations E.2.c Equipment Changes/Technological Improvements E.2.d Green Chop E.2.e Hand Harvesting E.2.f Fallow Land E.2.g Night Harvesting E.2.h No Burning E.2.i Pre-Harvesting Soil Preparation E.2.j Shed Packing E.2.k Shuttle System/Large Carrier The owner or operator of an Agricultural Operation Site shall implement at least one of the following CMPs in each Agricultural Parcel to reduce PM10 emissions from cropland-others (Category D.1.e). If the owner or operator selects "Fallow Land" as its CMP, the owner/operator must comply with Section E.6 of this rule. E.5.a Alternate Tilling E.5.b Application Efficiencies E.5.c Bailing/Large Bales E.5.d Bulk Materials Control E.5.e Chemigation/Fertigation E.5.f Conservation Irrigation E.5.g Fallow Land E.5.h Grinding/Chipping/Shredding E.5.i Integrated Pest Management E.5.j Irrigation Power Units E.5.k Mulching E.5.l Night Farming E.5.m No Burning E.5.n Non Tillage/Chemical Tillage		**Baling/Large Balers -** Using balers to harvest crop **Combined operations -** To combine equipment, performing several operations during one pass **Continuous tray/D.O.V., New drying techniques for dried fruit -** Any technology to reduce labor and tillage **Equipment changes/Technological improvements -** To modify the equipment such as combines, cotton pickers, tilling and harvesting equipment, increase equipment size, modify land planing and land leveling, matching the equipment to row spacing, and technological improvements **Fallowing land -** temporary or permanent removal from production. (e.g.: vineyard pullout, Raisin Industry Diversion program, wildlife/wetlands conservation program) **Floor management -** Smoothing and flattening the soil surface after nut harvest to remove post-harvest residue; maintain clean, smooth, firm floor throughout season by elimination of disking **Green Chop -** The harvesting of a forage crop without allowing it to dry in the field. **Hand harvesting -** Harvesting crop by hand **Night Harvesting -** Implementing cultural practices at night, or at times of high humidity. **No burning -** Switching to a crop/system that would not require waste burning **Pre-Harvest soil preparation -** Applying a light amount of water or stabilizing material to soil prior to harvest (when possible) **Shed Packing -** Packing commodities in a covered or closed area **Shuttle system/larger carrier -** multiple bin/trailer

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Ground Operations and Harvest					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			E.5.o Organic Practices E.5.p Permanent Crops E.5.q Reduced Pruning E.5.r Soil Amendments E.5.s Soil Incorporation E.5.t Sulfur: Reduction or Elimination of Dusting E.5.u Surface Roughening E.5.v Transgenic Crops E.5.w Wind Barrier		
Additional Requirements for High Risk Forecast Days	Unless choosing "limited harvest activity", a commercial farmer shall ensure implementation of at least one of the following on the day before and during a high risk forecast day: – Green chop, – Integrated pest management, – Multi-year crop	(note that none of the BMPs are required for Ground Operations and Harvest if the farmer implements conservation or reduced tillage for the tillage category—see exceptions in the overarching program elements section) "Limited harvest activity " means performing no ground operations on a high risk forecast day. Note that "limited harvest activity" is only implemented the day of a high risk forecast.	For windblown dust control (CMP Category D.1.f), the owner or operator of an agricultural operation site shall implement E.6.1. In addition to following E.6.1, if the owner or operator of an Agricultural Operation Site has fields that are in between crops or more permanently fallow, the owner or operator shall implement at least one of the CMPs in E.6.2. E.6.1 When preparing a field for planting, minimize the time that newly tilled soil is smooth and dry by leaving the field surface with large clods for as long as possible and bedding and planting the field as soon as possible once it no longer has large clods. E.6.2 For fields that are in between crops or are permanently fallow, the owner shall implement at least one of the CMPs below: E.6.2a Cover Crop E.6.2b Conservation Tillage E.6.2c Crop Residue Management E.6.2d Cross Wind Stripcropping E.6.2e Field Windbreaks E.6.2f Ridge Roughness E.6.2g Surface Roughening E.6.2h Wind Barrier	Imperial has no similar forecast.	No such forecast.

FIII-4 Noncropland

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Noncropland					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMPs	A commercial farmer shall implement at least one of the following best management practices: – Access restriction, – Aggregate cover, – Wind barrier, – Critical area planting, – Organic material cover, – Reduce vehicle speed, – Synthetic particulate suppressant, or Watering.		In addition to following E.6.1, if the owner or operator of an Agricultural Operation Site has fields that are in between crops or more permanently fallow, the owner or operator shall implement at least one of the CMPs in E.6.2. E.6.1 When preparing a field for planting, minimize the time that newly tilled soil is smooth and dry by leaving the field surface with large clods for as long as possible and bedding and planting the field as soon as possible once it no longer has large clods. E.6.2 For fields that are in between crops or are permanently fallow, the owner shall implement at least one of the CMPs below: E.6.2a Cover Crop E.6.2b Conservation Tillage E.6.2c Crop Residue Management E.6.2d Cross Wind Stripcropping E.6.2e Field Windbreaks E.6.2f Ridge Roughness E.6.2g Surface Roughening E.6.2h Wind Barrier Agricultural unpaved equipment or traffic areas with fifty (50) or more VDT, or twenty (20) or more VDT with 3 or more axle vehicles, must meet the stabilization and opacity requirements in Section E.4. The owner or operator of an agricultural operation site shall implement at least one of the following CMPs for each unpaved traffic area (CMP Category D.1.d) to reduce PM10 emissions at all times: E.4.a Chips/Mulches, Organic Materials, Polymers, Road Oil and Sand, E.4.b Gravel E.4.c Paving E.4.d Restricted Access E.4.e Speed Limit E.4.f Track-Out Control E.4.g Water Application E.4.h Field windbreak	Arizona's includes currently fallow land in its cropland definition, whereas Imperial has BMPs for temporarily and permanently fallow in its noncropland definition. Fallow land BMPs are repeated below under the cropland category, as well.	**Chips / Mulches, Organic Materials, Polymers, Road oil Sand** — Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements **Gravel -** Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained **Paving-** To pave currently unpaved areas **Restricted Access -** To restrict public access to private roads **Speed Limits-**Enforcement of speeds that reduce visible dust emissions **Track out control-**Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road **Water-** Application of water to unpaved roads and traffic areas **Wind barrier-**Artificial or vegetative wall/fence that disrupts the erosive flow of wind over unprotected land

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Noncropland					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			[and] On each day that high traffic accounts for 50 or more vehicle daily trips (VDT), or 20 or more VDT with 3 or more axles, on an Unpaved Traffic Area larger than one (1) acre, the owner/operator of an Agricultural Operation Site shall comply with the requirements of a stabilized unpaved road and limit VDE to 20% opacity by implementing or maintaining one or more of the following CMPs: E.4.i Pave. E.4.j Apply Chemical Stabilization as directed by product manufacturer to control dust on Unpaved Roads. E.4.k Apply and maintain Gravel, recrushed/recycled asphalt or other material of low Silt (<5%) content to a depth of three or more inches. E.4.l Water Application.		
Additional Requirements for High Risk Forecast Days	Unless choosing "watering on a high risk day", a commercial farmer shall ensure implementation of at least one of the following on the day before and during a high risk forecast day: – Aggregate cover, – Wind barrier, – Critical area planting, – Organic material cover, or – Synthetic particulate suppressant	Need definitions here "Watering on a high risk day" means reducing PM emissions and wind erosion by applying water to commercial farm road bare soil surfaces until the surfaces are visibly moist, on a high risk forecast day. Note that "watering on a high risk day" is only implemented the day of a high risk forecast.	For windblown dust control (CMP Category D.1.f), the owner or operator of an agricultural operation site shall implement E.6.1. In addition to following E.6.1, if the owner or operator of an Agricultural Operation Site has fields that are in between crops or more permanently fallow, the owner or operator shall implement at least one of the CMPs in E.6.2. E.6.1 When preparing a field for planting, minimize the time that newly tilled soil is smooth and dry by leaving the field surface with large clods for as long as possible and bedding and planting the field as soon as possible once it no longer has large clods. E.6.2 For fields that are in between crops or are permanently fallow, the owner shall implement at least one of the CMPs below: E.6.2a Cover Crop E.6.2b Conservation Tillage E.6.2c Crop Residue Management E.6.2d Cross Wind Stripcropping E.6.2e Field Windbreaks E.6.2f Ridge Roughness E.6.2g Surface Roughening E.6.2h Wind Barrier	Imperial has no similar forecast.	No such forecast.

FIII-5 Roads (Commercial Farm)

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Commercial Farm Roads					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMPs	A commercial farmer shall implement at least one of the following BMPs: – Access restriction, – Reduce vehicle speed, – Track-out control system, – Aggregate cover, – Synthetic particulate suppressant, Watering, or, – Organic material cover.		Agricultural unpaved roads with greater than fifty (50) or more vehicle daily trips (VDT), or twenty (20) or more VDT with three (3) or more axle vehicles, must meet the stabilization and opacity requirements in Section E.3. The owner or operator of an Agricultural Operation Site shall implement at least one of the following CMPs for each unpaved road (CMP Category D.1.c) to reduce PM10 emissions at all times: E.3.a Chips/Mulches, Organic Materials, polymers, road oil and sand, E.3.b Gravel E.3.c Paving, E.3.d Restricted access E.3.e Speed limit E.3.f Track-out control E.3.g Water Application E.3.h Field windbreak [and] On each day that high traffic accounts for 50 or more vehicle daily trips (VDT), or 20 or more VDT with 3 or more axles, on an unpaved road segment, the owner/operator of an Agricultural Operation Site shall comply with the requirements of a stabilized unpaved road and limit VDE to 20% opacity by implementing or maintaining one or more of the following CMPs: E.3.i Pave. E.3.j Apply Chemical Stabilization as directed by product manufacturer to control dust on Unpaved Roads. E.3.k Apply and maintain Gravel, recrushed/recycled asphalt or other material of low Silt (<5%) content to a depth of three or more inches. E.3.l Water Application. E.3.m Permanent road closure. E.3.n Restrict unauthorized vehicle access.		**Gravel -** Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained **Paving-** To pave currently unpaved areas **Restricted Access -** To restrict public access to private roads **Speed Limits-**Enforcement of speeds that reduce visible dust emissions **Track out control-**Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road **Water-** Application of water to unpaved roads and traffic areas **Wind barrier-**Artificial or vegetative wall/fence that disrupts the erosive flow of wind over unprotected land **Mechanical Pruning -** Using a machine instead of hand labor to prune **Chips / Mulches,** **Organic Materials,** **Polymers,** **Road oil** **Sand** Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Commercial Farm Roads					
Overarching Program Element/ Requirement	**Overarching Program Element/ Requirement**	**Overarching Program Element/ Requirement**	**Overarching Program Element/ Requirement**	**Overarching Program Element/ Requirement**	**Overarching Program Element/ Requirement**
Additional Requirements for High Risk Forecast Days	Unless choosing "watering on a high risk day", a commercial farmer shall ensure implementation of at least one of the following on the day before and during a high risk forecast day, on a road that experiences more than 20 VDT from 2 or more axle vehicles: – Aggregate cover, – Synthetic particulate suppressant, – Wind barrier, – Organic material cover, or – Roads are stabilized as determined by the silt content test method	Need definitions here "Watering on a high risk day" means reducing PM emissions and wind erosion by applying water to commercial farm road bare soil surfaces until the surfaces are visibly moist, on a high risk forecast day.	No such forecast.		No such forecast.

FIII-6 Cropland

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Cropland					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMPs	A commercial farmer shall implement at least one of the following BMPs: – Wind barrier, – Cover crop, – Cross-wind ridges, – Chips/mulches, – Sequential cropping – Residue management, – Surface roughening, AND – A commercial farmer shall ALSO implement at least one of the following BMPs: – Multi-year crop, – Permanent cover, or – Stabilization of soil prior to plant emergence.	(note that none of the BMPs for Cropland are required if the farmer implements conservation or reduced tillage for the tillage category—see exceptions in the overarching program elements section)	The owner or operator of an Agricultural Operation Site shall implement at least one of the following CMPs in each Agricultural Parcel to reduce PM10 emissions from cropland-others (Category D.1.e). If the owner or operator selects "Fallow Land" as its CMP, the owner/operator must comply with Section E.6 of this rule. E.5.a Alternate Tilling E.5.b Application Efficiencies E.5.c Bailing/Large Bales E.5.d Bulk Materials Control E.5.e Chemigation/Fertigation E.5.f Conservation Irrigation E.5.g Fallow Land E.5.h Grinding/Chipping/Shredding E.5.i Integrated Pest Management E.5.j Irrigation Power Units E.5.k Mulching E.5.l Night Farming E.5.m No Burning E.5.n Non Tillage/Chemical Tillage E.5.o Organic Practices E.5.p Permanent Crops E.5.q Reduced Pruning E.5.r Soil Amendments E.5.s Soil Incorporation E.5.t Sulfur: Reduction or Elimination of Dusting E.5.u Surface Roughening E.5.v Transgenic Crops E.5.w Wind Barrier E.6 For windblown dust control (CMP Category D.1.f), the owner or operator of an agricultural operation site shall implement E.6.1. In addition to following E.6.1, if the owner or operator of an Agricultural Operation Site has fields that are in between crops or more permanently fallow, the owner or operator shall implement at least one of the CMPs in E.6.2. E.6.1 When preparing a field for planting, minimize the time that newly tilled soil is smooth and dry by leaving the field surface with large clods for as long as possible		**Alternate Till -** Rotate tillage, leaving residue on soil **Application Efficiencies -** Use compact, low volume, or concentrate quantity with spray equipment, aerial applications, use micro-heads or infrared spot sprayer, electrostatic sprayers **Baling/Large Balers -** Using balers to harvest crop **Bulk materials control -** Minimize visible dust emissions from bulk materials **Chemigation/ Fertigation -** Application of chemicals thru an irrigation system **Conservation irrigation -** To conserve the quantity of water use, e.g.: drip, sprinkler, buried/underground line **Cover crops -** Use seeding or natural vegetation/regrowth of plants to cover soil surface **Fallowing land -** temporary or permanent removal from production. (e.g.: vineyard pullout, Raisin Industry Diversion program, wildlife/wetlands conservation program) **Grinding/Chipping/ Shredding -** Grinding prunings and orchard removals, instead of burning, incorporate to soil, to reduce emissions **Integrated Pest Management -** A decision process which uses a combination of techniques including organic, conventional, biological farming practices to suppress pests problems **Irrigation Power Units -** Use cleaner burning engines, electric motors (CMP only applicable if engines are cleaner than current rule requirements) **Mulching -** Applying plant residue or other material to soil surface or incorporating into soil. **Night farming -** Operate at night where practical when moisture levels are higher and winds are lighter **No burning -** Switching to a crop/system that would not require waste burning

Crop Operations Rules A.A.C. R18-2-610 & 610.03					
Cropland					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rule 806)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			and bedding and planting the field as soon as possible once it no longer has large clods. E.6.2 For fields that are in between crops or are permanently fallow, the owner shall implement at least one of the CMPs below: E.6.2a Cover Crop E.6.2b Conservation Tillage E.6.2c Crop Residue Management E.6.2d Cross Wind Stripcropping E.6.2e Field Windbreaks E.6.2f Ridge Roughness E.6.2g Surface Roughening E.6.2h Wind Barrier		**Non tillage / Chemical tillage -** Use flail mower, low volume sprayers, e.g.: use heat delivery system for cotton defoliation **Organic Practices -** Use biological control methods, use non-chemical control methods **Permanent Crops -** Having an established permanent crop **Reduced pruning -** Reduce frequency of pruning (e.g.: one time per year, or every other year) **Soil amendments -** Organic or chemical materials applied to the soil for improvement (e.g.: gypsum, lime, polyacrilamide) **Soil incorporation -** Disking residues and/or soil incorporation of residue **Sulfur - reduction or elimination of dusting -** Organic chemical used to control disease in crop, ornamental and home and gardens **Surface roughening -** Leaving soil surface as it stands or clods of soil when fallow, preparing planting surface perpendicular to wind direction **Transgenic crops -** Use "herbicide-ready" **Wind barrier -** Artificial or vegetative wall/fence that disrupts the erosive flow of wind over unprotected land
Additional Requirements for High Risk Forecast Days	A commercial farmer shall ensure implementation of at least one of the following on the day before and during a high risk forecast day: Wind barrier, Cover crop, Cross-wind ridges, Chips/mulches, Surface roughening, Multi-year crop, Permanent cover, Stabilization of soil prior to plant emergence, or Residue management.	(note that none of the BMPs for Cropland are required if the farmer implements conservation or reduced tillage for the tillage category—see exceptions in the overarching program elements section)Need definitions here	No such forecast.		No such forecast.

FIII-7 Animal Operations Overarching Requirements

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
Purpose	To reduce PM emissions from commercial agricultural operations through use of best management practice (BMP). (A.A.C. R18-2-611.03(A))	PM includes both PM2.5 and PM10. (A.A.C. R18-2-611.01(1)(j)) "Best Management Practice" (BMP) means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM emissions from a regulated agricultural activity.	To reduce the amount of pollutants generated from Large Confined Animal Facilities (beef feedlots and dairy operations) by requiring Conservation Management Practices to prevent, reduce, or mitigate PM-10.	Herein, mostly only PM-10 related requirements are listed. Also, conservation management practices per policy 38 only apply to dairy and beef feedlot operations. Rule 420 only applies to beef feedlots.	To limit fugitive dust from agricultural operation sites through use of Conservation Management Practice Plans. (Rule 4550) Conservation Management Practices (CMP): an activity or procedure that reduces air pollutants normally emitted by, or associated with, an agricultural activity. (Rule 4550 Section 3.9)
Facility Definitions	"Commercial dairy operation" means a dairy operation with more than 150 dairy cattle within the applicable boundaries. (A.A.C. R18-2-611.01 (3)(f)) "Commercial beef cattle feedlot" means a beef cattle feedlot with more than 500 beef cattle within the applicable boundaries. (A.A.C. R18-2-611.01 (5)(g)) "Commercial poultry facility" means a poultry operation with more than 25,000 egg laying hens within the applicable boundaries. (A.A.C. R18-2-611.01 (4)(m)) "Commercial swine facility" means a swine operation with more than 50 animal units for more than 30 consecutive days within the applicable boundaries. One thousand pounds equals one animal unit. (A.A.C. R18-2-611.01 (2)(f))		Large confined animal facility (LCAF) is any Confined Animal Facility that maintains on any one day: 1,000 or more milk-producing dairy cows; 3,500 or more beef cattle, calves, heifers, or other cattle; 100,000 or more turkeys; or 650,000 more chickens other than laying hens; 650,000 or more laying hens; or 3,000 or more swine; 15,000 or more sheep, lambs, or goats; 2,500 or more horses; 650,000 or more ducks; or 30,000 or more rabbits or other animals.		AFOs are lots or facilities where animals are or will be gathered, fed, stabled for a total of 45 days or more in any 12 month period and where crops, vegetation, etc. are not sustained on any part. 500 or more mature dairy cows, milked or dry 190 or more cattle (other than mature dairy cows or veal calves). Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs 55,000 or more turkeys 125,000 or more chickens (other than laying hens) 82,000 or more laying hens. Agricultural operation site" is one or more agriculture parcels that are both under the same or common ownership or operation or common control and are located on one or more contiguous or adjacent properties wholly within the San Joaquin Valley Air Basin. Agricultural parcel includes but is not limited to cropland and animal feeding operations (AFOs).

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
					"Agriculture operations" includes the raising of fowl or animals for the primary purpose of earning a living or conducting research or instruction by educational institution.
Basic Program Structure	Rules 611 & 611.03 Commercial animal operator ("Operator") must complete a (feeless) agricultural PM permit record form (essentially a general permit) demonstrating compliance with the applicable rules. An operator must also implement at least one BMP from each category (e.g. the waste handling category contains multiple options) that pertains to the kind of commercial facility (i.e. dairy, beef feedlot, poultry, or swine). The operator will submit a survey every three years to update logistical information and BMP choices. Operator will maintain records demonstrating compliance with permit record form.		Rule 217 Any Person using or operating a Large Confined Animal Facility shall acquire and maintain a Large Confined Animal Facilities (LCAF) permit to control significant sources and pollutants, and to let the agency know what the significant sources are at the facility. Operators of LCAFs shall implement the control measures identified in their emissions mitigation plan, which may be selected from Policy 38. The Owner or operator of an LCAF shall apply the control measures in the mitigation plan on a six month schedule. Each year, the owner or operator shall submit an annual compliance plan that updates the information submitted for the permit application. The mitigation plan demonstrates that the facility will use RACT to reduce emissions that contribute to non-attainment. Control measures identified in a facility's emissions mitigation plan may be selected from Air District Policy Number 38, Recommended Mitigation Measures for Large Confined Animal Facilities. Policy Number 38 only contains mitigation measures for beef feedlots and dairy operations.	Agricultural paved and unpaved roads and open areas are mitigated separately in a fugitive dust rule (Rule 800). For further information, see the fugitive dust rule benchmark. Per rule 217 (Large Confined Animal Facilities Permits Requires), the rule sets for the permitting requirements for agricultural sources subject to permit, including Large Confined Animal Facilities (LCAF). Rule 800 of Imperial County applies to off-field agricultural sources:	Regulated facilities submit CMP applications for each agricultural operation site, with rule dictated details and chosen CMPs. Facilities shall implement the CMPs as contained in the approved CMP plan. An owner/operator shall select one CMP from the CMP list for each of the applicable CMP categories for each agricultural parcel of an agricultural operation site, except as provided below … (See Exceptions Section). (Rule 4550)

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			Rule 420 contains more specific requirements for beef feedlots (which can be found in the beef feed lot program specific requirements below), including a dust plan. Each year, the owner or operator of a LCAF shall submit an annual compliance plan that updates the information provided in the original application (including logistical and mitigation plan information). Operator will keep records that specify daily number of animals maintained at the facility.	Any Agricultural Source or activity at an Agricultural Source that falls into one or more of the following categories: C.25.a Outdoor handling, storage and transport of Bulk Material; C.25.b Paved Road; C.25.c Unpaved Road; or C.25.d Unpaved Traffic Area. Because LCAFs are agricultural sources subject to permit, Imperial's Rule 800 applies to handling of bulk materials, paved roads, unpaved roads, and unpaved traffic areas on LCAFs. Please see the fugitive dust benchmarking for control of these sources.	

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMP Exceptions	For all facilities: Operators may develop other BMPs that are proven effective through on-operation demonstration trials to the [Agricultural Best Management Practices] Committee…[but] the newly developed BMPs are not effective unless submitted as described in A.R.S. §49-457(L) which states: L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.		Off-field Agricultural sources, necessary to minimize or respond to adverse effects on agricultural crops caused during freezing temperatures as declared by the National Weather Service, are exempted from dust mitigation regulation per rule 800.	There are no BMPs for anything but beef feedlots and dairy operations (except roads). Road fall into what is essentially Imperial's fugitive dust rule. OFF-FIELD AGRICULTURAL SOURCE: Any Agricultural Source or activity at an Agricultural Source that falls into one or more of the following categories: C.25.a Outdoor handling, storage and transport of Bulk Material; C.25.b Paved Road; C.25.c Unpaved Road; or C.25.d Unpaved Traffic Area.	6.2.2 If a CMP can only be selected for implementation on a portion of an agricultural operation site, an owner/operator shall select an additional CMP within the CMP category to be implemented on the remaining acreage or remaining AFO. 6.2.3 An owner/operator may select a substitute CMP from another CMP category when no feasible CMP can be identified from one category. This provision shall not apply for the unpaved road, and unpaved vehicle/equipment traffic area CMP categories. 6.2.3.1 An owner/operator may identify or develop a new CMP not on the CMP list to be used to comply with the requirements of this rule. Prior to use of the new CMP the owner/operator must obtain the interim approval of the APCO to use a new CMP to meet the requirements of Section 6.2. The owner/operator shall demonstrate that the new CMP achieves PM10 emission reductions that are at least equivalent to other CMPs on the CMP list that could be selected for the applicable operation. 6.2.3.2 The APCO will perform an independent analysis of proposed CMPs to determine that they achieve PM10 emission reductions that are at least equivalent to other CMPs on the CMP list….This analysis shall be made using the most recent emission factors provided by EPA or CARB when available… 6.2.3.3 An owner/operator may satisfy the requirements of Rule 8081 by implementing CMPs for the unpaved road and unpaved vehicle/equipment traffic area CMP categories that are equivalent to the control measures specified in Rule 8081. An animal operation that operates below the animal unit thresholds only have to maintain

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
					records. (Rule 4550)
BMP General Permit Record Form	A commercial animal operator who engages in a regulated agricultural activity shall annually complete a Best Management Practices Program General Permit Record Form. The form shall include the following information: 1.The name of the commercial animal operator, signature, and date signed, 2.The mailing address or physical address of the commercial animal operation, and 3.The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.		Rule 217 (paraphrased in part): An The permit application shall include: Information that the Air Pollution Control Officer deems necessary to prepare and emissions inventory. List of stationary combustion equipment, and other details. List of all other significant sources of air pollution…. Total capacity of the facility in terms of commercial production animal and bird population An emissions mitigation plan that demonstrates that the facility will use RACT to reduce emissions of pollutants that contribute to the non-attainment of any ambient air quality standard, and that are within the Air Districts regulatory authority. In addition, the dust control plan for beef feedlots shall adhere to the requirements within Rule 420. Annual Renewal Permits to Operate for LCAF shall be renewed according to the conditions set forth within Rule 206 and Rule 301. Pursuant to District Rule 212, the APCO may update LCAF permits upon annual renewal to include conditions necessary for compliance.		Conservation Management Practice Application (CMP Application) is a document prepared and submitted by the owner/operator of an agricultural operation site that lists the selected CMPs for implementation. The CMP application also contains, but is not limited to: contact information for the owner/operator, and a site plan or map (maintained on-site) describing the location of the agricultural operation site and locations of agricultural parcels where CMPs will be implemented and the location of unpaved roads and unpaved equipment/traffic areas to be covered by the CMP Plan other information describing the extent, duration of CMP implementation and other information needed by the District to calculate emission reductions. (4550)

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
BMP Survey (A.A.C. R18-2-611.03(D)(1)(a)-(m))	Every three years, beginning in calendar year 2017, the commercial animal operator shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA). The Survey information submitted to the ADA shall be compiled by the ADA in a format that does not refer to a commercial animal operator's name, shall aggregate the data from the Survey's received, and be submitted to the Department. The 3-year Survey shall include: 1. The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices; 2. The signature of the commercial farmer and the date the form was signed; 3. The number of animals in a commercial dairy operation, beef cattle feed lot, poultry facility or swine facility; 4. The total miles of unpaved roads at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility; 5. The total acreage of the unpaved access connections and equipment areas at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility; 6. The best management practices selected for each category; and 7. For commercial dairy operations and beef cattle feedlots, an acknowledgement that water was applied on the day of a high risk day as predicted by the Pinal County Dust Control Forecast. For commercial dairy operations and beef cattle feedlots, an acknowledgement that water was applied on the day of a high risk day as predicted by the Pinal County Dust Control Forecast.	"Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following: a) Projected meteorological conditions, including: i) Wind speed and direction, ii) Stagnation, iii) Recent precipitation, and iv) Potential for precipitation; b) Existing concentrations of air pollution at the time of the forecast; and c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.	The owner or operator of a large confined animal facility (beef and dairy facility) shall adhere and apply to the selected control measures outlined in their mitigation plan (which contains mitigation measures that may be selected from the recommended mitigation measures policy, Policy No. 38) pursuant to a six month schedule approved by the APCO. (Or from rule 420 in the case of beef feedlots and dairy operations) On or before January 1, each year the owner or operator of a LCAF shall submit an annual compliance plan that updates the information submitted for the LCAF application.		The survey the same thing as the application in San Joaquin.

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Overarching Program Elements/Requirements					
Overarching Program Element/ Requirement	**West Pinal County**	**Comments/ Explanatory Definitions re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments/ Explanatory Definitions re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
Maintaining Records/Compliance (A.A.C. R18-2-611.03(J))	A commercial farmer shall maintain records demonstrating compliance (including records of any changes to BMPs) with the applicable rules for three years. ADEQ shall document noncompliance with the applicable rules before issuing a compliance orders. A commercial farmer who is not in compliance with the applicable rules is subject to the provisions in A.R.S. § 49-457(I), (J), and (K)		Any violation of this underlying LCAF permit constitutes a violation of Rule 217. Recordkeeping All owners of confined animal facilities, regardless of size, shall keep records that specify the daily number of animals maintained at the facility. Current records shall be maintained and kept on-site for two years.		An owner/operator shall, upon request, make available to the APCO the records required to be kept pursuant to Section 6.5.1 and Section 6.5.2. 6.5.1. An owner/operator subject to Section 5.0 shall maintain the following records for a minimum of five (5) years: 6.5.1.1 A copy of each CMP Application and CMP Plan. 6.5.1.2 Supporting information necessary to confirm the implementation of the CMPs. 6.5.2 An owner/operator claiming exemption pursuant to Section 4.0 (animal operations operating beneath the animal unit thresholds) shall maintain records for a minimum of five (5) years that demonstrate that the agricultural operation site or agricultural parcel qualified for the exemption.

FIII-8 Commercial Dairy

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Dairy Specific Program Requirements other than BMPs					
Overarching Program Requirement	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
General Program Requirement Specific to Commercial Dairy	BMP Choices and Overarching Program Requirements as listed above and On the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, commercial dairy operations within the Pinal County PM Nonattainment Area shall apply and maintain one of the four following BMPs on unpaved roads that experience more than 20 VDT from 2 or more axle vehicles: 1. Apply and maintain pavement in high traffic areas, 2. Apply and maintain aggregate cover, 3. Apply and maintain synthetic particulate suppressant, or 4. Apply and maintain water as a dust suppressant. VDT" (Vehicle trips per day) means trips per day made by one vehicle, in one direction.		Air Districts Policy Number 38, Recommended Mitigation Measures for Large Confined Animal Facilities.		CMP lists per rule 4550.

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Dairy Specific BMPs					
BMP Category within Facility	**West Pinal County Options**	**Comments re: West Pinal**	**Imperial Requirement (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin Requirement (Rule 4550 CMP List)**
Arenas, Corrals, and Pens (A.A.C. R18-2-611.03(D)(1)(a)-(m)) (means areas where animals are confined for the purposes of, but not limited to, feeding, displaying, safety, racing, exercising, or husbandry Definitions (1)(b))	Use free stall housing – means enclosing one cow per stall, with concrete floors. Provide shade in corral - means increasing stocking density and reducing animal movement by using a permanent structure Provide cooling in corral - using cooling systems, increasing stocking density in the cool areas of the corrals. Cement cattle walkway to milk barn - fencing pathways, restricting dairy cattle to concrete floors. Groom manure surface - means: Flushing or vacuuming lanes daily, Scraping and harrowing pens weekly, and noving manure every four months leaving an even corral surface of compacted manure on top of the soil. Pile manure between cleanings means collecting loose surface materials within the confines of the surface area of the occupied feed pen every two weeks. to contain the loose manure materials Water misting systems - means using systems that project a cloud of very small water particles onto manure surface, keeping the surface visibly moist. Use drag equipment to maintain pens - means using manure equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions. Push equipment means manure harvesting equipment pushed in front of a tractor. Pile manure between cleanings means reducing PM emissions by collecting loose surface materials within the confines of the surface area of the occupied feed pen every two weeks. Feed green chop - means feeding high moisture feed that contains at least 30% moisture directly to dairy cattle. Keep Calves in barns or hutches Calves means young dairy stock under two months of age. Hutches means raised, roofed enclosures that protect the calves from the elements. Do not run cattle means reducing PM10 emissions by walking dairy cattle to the milking barn Apply fibrous layer Apply a fibrous layer means reducing soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Minimum depth of two inches above the soil surface and coverage of 70 % Wind barrier means constructing a fence or structure, or vegetative barrier by planting a row of trees or shrubs to reduce wind speed. For fences and structures, wind barrier density ≥ 50% and the height proportionate to the		**Freestall Barns:** Owners/operators housing animals in freestalls shall incorporate at least two (2) of the following mitigation measures in each freestall barn: 1.Vacuum or scrape freestalls during, after, or prior to each milking, in accordance with NRCS Agricultural Waste Management Field Handbook Chapter 10 Section 651.1002 2.Inspect water pipes and troughs and repair every 14 days. 3.Use non-manure-based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond hulls, sand) 4.Remove wet manure from individual cow freestall beds at least once every (14) days. 5.Rake, harrow, scrape, or grade bedding in freestalls at least twice every seven (7) days. 6.Use a dry manure handling system, such as scraping, instead of a liquid manure handling system such as a flush system. 7.Have no animals in exercise pens, corrals, or dry lots at any time. 8.Flush freestalls more frequently than the milking schedule. Flush in accordance with NRCS Agricultural Waste Management Handbook Chapter 10 Section 651.1002 or more recent NRCS guidance. 9.Implement alternative mitigation measure(s), not listed above, subject to approval of the ICAPCO. **Corrals, Pens, etc.** Owner/operators shallincorporate at least (4) of the following where animals housed in the last thirty (30) days. 1.Clean manure from corrals at least once every two (2) years. 2.Manage corrals such that the manure depth in the corral does not exceed thirty-six (36) inches at any time or point, except for in-corral mounting. 3.Knockdown fence line manure build-up prior to it exceeding a height of twenty-four (24) inches at any time or point. 4.Maintain corrals to ensure drainage and prevent water from standing more than seventy-two (72) hours after a storm 5.Maintain corrals and drylots so that there are no indentions in the surface where puddles may form and remain for more than seventy-two (72) hours. 6.Install floats on the troughs or use another method approved by the ICAPCD to ensure that the water in the troughs does not intentionally or unintentionally overflow	Imperial's BMPs are in place to prevent a multitude of pollutants and are not focused on PM10 prevention or mitigation.	– Use of freestall housing Shaded areas in open Corrals - Animals in open pens will loaf in shade areas increasing stocking density and reducing dust – Frequent scraping and or manure removal - Removal of manure from open corrals – Scraping/harrowing - Scraping/ harrowing in morning hours when moisture is higher. – Sprinkling of open corral - Ensure adequate corral surface moisture level to prevent visible dust emissions. *This measure is not recommended for lactating cows – Pull-type Manure harvesting equipment -Using a pull-type piece of equipment to leave an even corral surface – Fibrous layer in dusty areas- Addition of fibrous material to working pens – Downwind shelterbelts/ boundary trees - Planting rows of vegetation around facility and surrounding to create a barrier for air exiting from the facilities (located in overall management/feeding category)

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Dairy Specific BMPs					
BMP Category within Facility	**West Pinal County Options**	**Comments re: West Pinal**	**Imperial Requirement (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin Requirement (Rule 4550 CMP List)**
	downwind protected area 10:1. For vegetative barriers, compliance with NRCS Conservation, Code 380, Windbreak/Shelterbelt Establishment (2009).		or spill onto an earthen ground. 7.Inspect water pipes and troughs and repair leaks at least once every seven (7) days.		
Animal Waste (and Feed) Handling and Transporting (A.A.C. R18-2-611.03(D)(2)(a)-(f))	Feed higher moisture feed to dairy cattle means reducing PM emissions by feeding dairy cattle one or any combination of the following: i. Add water to ration mix to achieve a 20% minimum moisture level, ii. Add molasses or tallow to ration mix at a minimum of 1%, iii. Add silage, or iv. Add green chop. . Feed green chop - means feeding high moisture feed that contains at least 30% moisture directly to dairy cattle Store and maintain feed stock - means reducing PM10 emissions and wind erosion by storing feed stock in a covered area where the commodity is surrounded on at least three sides by a structure. Covers for silage means reducing PM emissions and wind erosion by using large plastic tarps to completely cover silage. Store silage in bunkers (bunkers being below ground level storage systems for storing large amount of silage, which is covered with a plastic tarp) Cover manure hauling trucks - means reducing PM emissions by completely covering the top of the loaded area. Do not load manure trucks with dry manure when wind exceeds 15 mph		**Feed and Silage Operations:** Owners/operators shall incorporate at least three (3) of the following feed mitigation measures: 1.Feed according to National Research Council (NRC) guidelines. 2.Feed animals high moisture corn or steam-flaked corn and not feed animals dry rolled corn. 3.Remove spoiled feed from feed bunks at least once every thirty (30) days. 4.Remove spilled feed from feed alleyways at least once every thirty (30) days. 5.Remove uneaten wet feed bunks within seventy-two (72) hours of a rain event. 6.Feed or dispose of rations within forty-eight (48) hours of grinding and mixing rations. 7.Store grain in a weatherproof structure. 8.Cover the horizontal surface of silage piles, except for the area where feed is being removed from the pile. 9.Collect leachate from the silage piles and send it to a waste treatment system such as a lagoon at least once every twenty-four (24) hours. 10.Implement alternative mitigation measure(s), not listed above, subject to approval of the ICAPCO. Owners/operators that handle or store manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures: 1.Cover dry manure piles outside the pens with a waterproof covering, except for times, not to exceed twenty-four (24) hours per year, when wind events remove the covering. 2.Store no animal waste piles outside the pens. 3.Remove manure from the facility within seventy-two (72) hours of removal from the pens or corrals. 4.Remove manure from pans or corrals and transport to an on-site composting area utilizing approved composting procedures. 5.Implement alternative mitigation measure(s), not listed above, subject to approval of the ICAPCO. Handling Manure in Liquid Form: Owner/operators that handle manure in a liquid form shall incorporate at least one (1) of the following mitigation measures: 1.Manage the facility such that lagoons only contain waste	Imperial's BMPs are in place to prevent a multitude of pollutants and are not focused on PM10 prevention or mitigation.	– Wet feed during mixing- To increase moisture feed levels – Feeding near dusk- Feeding young stock during evening hours – Bulk materials control - Minimize visible dust emissions from bulk materials – Place wet material in feedwagon first before mixing - Mix wet feed with dry feed for suppression.

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Dairy Specific BMPs					
BMP Category within Facility	**West Pinal County Options**	**Comments re: West Pinal**	**Imperial Requirement (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin Requirement (Rule 4550 CMP List)**
			from the milking parlor and storm water. 2.a. Use phototrophic lagoons, or b. Use an anaerobic treatment lagoon. 3.Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon. 4.Maintain lagoon at a pH between 6.5 and 7.5. 5.Implement alternative mitigation measure(s), not listed above, subject to approval of the ICAPCO.		
Unpaved Access Connections (A.A.C. R18-2-611.03(D)(3)(a)-(h)) <u>(means any unpaved road connection which connects to a paved public road)</u>	– Install signage to limit vehicle speed to 15 mph – Install speed control devices – Restrict access to though traffic Install and maintain a track-out control device (a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road (Definitions in R18-2-611(1)(m))) – Apply and maintain pavement in high traffic areas (more than 20 vehicle trips per day from 2 or more axle vehicles.) – Apply and maintain synthetic particulate suppressant (meaning reducing PM emissions and wind erosion by providing a stabilized soil surface on a commercial dairy operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.) – Apply and maintain water as a dust suppressant		Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the		– Speed reduction - Enforcement of speeds that reduce visible dust emissions – Access restriction - To restrict public access to private roads – Pavement - To pave currently unpaved areas – Dust suppressants-chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional Requirements – Gravel- Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained – Appropriate equipment and Vehicles -Using trip appropriate vehicles

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Dairy Specific BMPs					
BMP Category within Facility	**West Pinal County Options**	**Comments re: West Pinal**	**Imperial Requirement (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin Requirement (Rule 4550 CMP List)**
			owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures:		
Unpaved Roads or Feed Lanes (A.A.C. R18-2-611.03(D)(4)(a)-(j)) (means roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation)	– Install engine speed governors on feed truck to 15 mph – Install signage to limit vehicle speed to 15 mph Install speed control devices – Restrict access to through traffic – Apply and maintain pavement in high traffic areas (more than 20 vehicle trips per day from 2 or more axle vehicles.) – Apply and maintain aggregate cover (meaning reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads or feed lanes. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep. Definitions 611(2)(a)) – Apply and maintain synthetic particulate suppressant – Apply and maintain water as a dust suppressant Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks – Apply and maintain pavement or cement feed lanes	"Unpaved roads or feed lanes" is the mandated statutory language in A.R.S. 49-457, and the rules were written to match that language as much as possible. However, in A.A.C. rule, "unpaved roads or feed lanes" means roads **and** feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation. The definition of unpaved roads or feed lanes encompasses both unpaved roads and feed lanes. It has been generally understood in the past and present that whether a source is an unpaved road or a feed lane, if it is a source of dust, then it must be controlled. The rule is written to require controls on both	((((Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and		– Speed reduction- Enforcement of speeds that reduce visible dust emissions – Speed Bumps- Installation of mechanisms to slow traffic – Access restriction- To restrict public access to private roads – Gravel- Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained – Dust suppressants-Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional requirements. R8011: Dust Suppressants: includes water, hygroscopic materials and, chemical/organic stabilization/suppression materials. – Appropriate equipment and Vehicles- Using trip appropriate vehicles – Pavement- To pave currently unpaved areas – Track out control- Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Dairy Specific BMPs					
BMP Category within Facility	**West Pinal County Options**	**Comments re: West Pinal**	**Imperial Requirement (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin Requirement (Rule 4550 CMP List)**
		sources, and to clarify in the case that a feed lane may also be called an "unpaved road" or vice versa. The word "or" in the term does not indicate that only one type of road or the other must be controlled.	comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit; F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))		

FIII-9 Commercial Beef Feedlot

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Beef Feedlot Specific Program Requirements other than BMPs					
Overarching Program Requirement	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), 420, and 800, and Policy 38)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
General Program Requirement Specific to Beef Feedlot	BMP Choices and Overarching Program Requirements as listed above and In addition to other BMPs, commercial beef feedlots within the Pinal County PM Nonattainment Area, shall add water to pen surface (reducing PM emissions and wind erosion by applying at least three to six gallons of water per head/per day in pens occupied by beef cattle) on the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast.	See Exhibit F-V, moisture testing in pens is threatens operations which already have conservation limits, and need to be able to predict the amount of water they will be using as much as possible. In addition, it is unsafe to expose on foot personnel to over 100 animals that weigh over 1,400 pounds in each pen. Such a program would violate the feed yards' safety plans, according to industry representatives. Also, industry representative have stated that harvesting manure more frequently as a means to elevate moisture content would not be technically feasible. Manure harvesting is technically feasible when the cattle is turned over from the feedlot to a packing plant. In some areas in the panhandle or central plans, estimated turnover rate is based on animals only growing 1.5 to 1.8 times their weight from when they entered the feedlot. However, in Pinal	Rule Specific to Beef Feedlots (Rule 420): In addition to the conditions set forth in the overarching Large Confined Animal Facilities an application for a LCAF permit shall include a written plan designed to effectively control Dust. Such Dust control plan shall contain the following: B.1 Procedures for assuring Manure at all times is maintained at a moisture factor between 20% and 40%, in the top three inches (3") in occupied pens. B.2 An outline of Manure management practices, including standards and time tables for Manure removal, designed to effectively control Dust and to prevent adverse public health conditions. Exceptions; The Air Pollution Control Officer may grant exception to the provisions of section B.1 only for the following: D.1 An exception to the minimum 20% moisture content limit may be granted for a period of up to sixty (60) days in any fiscal year, provided a written application is submitted describing in detail an alternative dust control plan. The alternative dust control plan shall contain measures to control Dust as effectively as to assure compliance with Rule 401, Opacity, and Rule 407, Nuisance. D.2 An exception to the maximum 40% moisture content limit may be allowed during rainy periods, as defined in Rule 101, Definitions. Compliance : The Air Pollution Control Officer shall grant an Authority to Construct (ATC) or a Permit to Operate (PTO) upon receiving a Dust control plan which he believes is reasonably designed to meet the criteria set forth in B.1 and B.2 above. Failure to comply with the terms of an approved Dust control plan shall be grounds for an ATC or PTO revocation and/or for imposition of other penalties and sanctions contained in the District's rules and regulations. Imperial also has a test method to determine manure moisture content within occupied pens.		No additional general program requirements to beef feedlots except for BMPs below.

		County, the turnover rate is less frequent, where animals typically grow almost five times their weigh from when they entered the feedlot. It takes much longer for cattle to grow five times their weight so that the turnover rate is much less frequent than in other areas. Therefore, harvesting manure more than two times per year because growers harvest manure during turnover periods, of which there are typically only two per year.			

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Beef Feedlot Specific BMPs					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
Arenas, Corrals, and Pens (A.A.C. R18-2-611.03(E)(1)(a)-(j))	– Concrete aprons (means reducing PM emissions by using solidly formed concrete surface, at least 4 inches thick on top of the soil surface, inside the feed pen for 8 feet approaching the feed bunk or water trough.) – Provide shade in corral (means reducing PM emissions by increasing stocking density and reducing animal movement by using a permanent structure, which provides at least 16 square feet per animal of shaded pen surface.) – Add water to pen surface (means reducing PM emissions and wind erosion by applying at least three to six gallons of water per head/per day in pens occupied by beef cattle.) – Manure removal ("Frequent manure removal" means reducing PM emissions and wind erosion by harvesting loose manure on top of the pen surface at least once every six months.) – Pile manure between cleanings (means reducing PM emissions by collecting loose manure surface materials, by scraping or pushing, within the confines of the surface area of the occupied feed pen at least four times per year.) – Feed higher moisture feed to beef cattle (means reducing PM emissions by feeding beef cattle feed that contains at least 30% moisture.) – Control cattle during movements (means reducing PM emissions by suppressing the animal's ability to run by driving them forward while intruding on their "flight zones" or restraining the		Owner/operators housing animals in corrals shall incorporate at least four (4) of the following mitigation measures in each corral where animals have been housed in the last thirty (30) days. Clean manure from corrals at least once every two (2) years Manage corrals such that the manure depth in the corral does not exceed thirty-six (36) inches at any time or point, except for in-corral mounting Knockdown fence line manure build-up prior to it exceeding a height of twenty-four (24) inches at any time or point Maintain corrals to ensure drainage and prevent water from standing more than seventy-two (72) hours after a storm Maintain corrals and drylots so that there are no indentions in the surface where puddles may form and remaining for more than seventy-two (72) hours. Install floats on the troughs or use another method approved by the ICAPCD to ensure that the water in the troughs does not intentionally or unintentionally overflow or spill onto an earthen ground Inspect water pipes and troughs and repair leaks at least once every seven (7) days. Clean the area where the animals stand to consume feed such that the depth of animal waste in this area does not exceed thirty-six (36) inches at any time or point.		– Shade for animal - Animals in open pens will loaf in shade areas increasing stocking density and reducing dust – Sprinkle - Ensure adequate pen surface moisture level to prevent visible dust emissions – Frequent scraping and or manure removal – Removal of powdery dust – Pull-type Manure harvesting equipment -Using a piece of equipment to leave an even corral surface – Fibrous layer in working areas (for alley, etc.) -Addition of fibrous material to areas

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Beef Feedlot Specific BMPs					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
	animal's movement.) – Use drag equipment to maintain pens (means using manure harvesting equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions) – Apply a fibrous layer (reducing PM emissions and soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Material shall be consistently applied to a minimum depth of two inches above the soil surface and coverage should be a minimum of 70 percent.) – Apply a wind barrier – (means reducing PM10 emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).)		Use a dry animal waste handling system, such as scraping, instead of a liquid animal waste handling system, such as a flush system. Implement alternative mitigation measure(s), not listed above, subject to approval of the ICAPCO.		
Animal Waste (and Feed) Handling and Transporting (A.A.C. R18-2-611.03(E)(2)(a)-(g))	– Feed higher moisture feed to beef cattle (means reducing PM emissions by feeding beef cattle feed that contains at least 30% moisture.) – Add molasses or tallow to feed (that it equals three percent of the total ration.) – Store and maintain feed stock (in a covered area where the commodity is surrounded on at least three sides by a structure.) – Bulk materials (using a closed conveyor system instead of vehicular means to move grain or other feedstuffs (Definitions 611(3)(e))) – Use drag equipment to maintain pens (using manure harvesting equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions) – Cover manure hauling trucks (completely covering the top of the loaded area) – Do not load manure when wind exceeds 15 mph		Owners/operators that handle or store manure or separated solids outside the animal housing shall incorporate at least one (1) of the following mitigation measures: Cover dry manure piles outside the pens with a waterproof covering, except for times, not to exceed twenty-four (24) hours per year, when wind events remove the covering Store no dry animal waste piles outside the pens Remove manure from the facility within seventy-two (72) hours of removal form the pens or corrals Remove manure from pens or corrals and transport to an on-site composting area utilizing approved composting procedures Implement alternative mitigation measures not listed, subject to approval of the ICAPCO Owners/operators shall incorporate at least three (3) of the following feed mitigation measures: Feed according to National Research Council (NRC) guidelines. Feed animals high moisture corn or steam-flaked corn and not feed animals dry rolled corn. Remove spoiled feed from feed bunks at least once every thirty (30) days.		– Wet feed during mixing-To increase moisture feed levels – Place wet material in feedwagon first-Mix wet feed with dry feed for suppression – Bulk materials control - minimize visible dust emissions from bulk materials – Downwind shelterbelts/boundary trees-Planting rows of vegetation around facility and surrounding to create a barrier for air exiting from the facility – Feeding near dusk-Feeding during evening hours

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Beef Feedlot Specific BMPs					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			Remove spilled feed from feed alleyways at least once every thirty (30) days Remove uneaten wet feed bunks within seventy-two (72) hours of a rain event Feed or dispose of rations within forty-eight (48) hours of grinding an mixing rations. Cover the horizontal surface of silage piles, except fo the area where feed is being removed from the pile Collect leachate from the lisage piles and send it to a waste treatment system such as a lagoon at least once every twenty-four (24) hours. Implement alternative mitigation measures, subject to approval of the ICAPCO.		
Unpaved Access Connections (A.A.C. R18-2-611.03(E)(3)(a)-(e))	– Install and maintain a track-out control device Apply and maintain pavement in high traffic areas (more than 20 vehicle trips per day from 2 or more axle vehicles) – Apply and maintain aggregate cover (aggregate cover means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads or feed lanes. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.) – Apply and maintain synthetic particulate suppressant ("Synthetic particulate suppressant" means reducing PM emissions and wind erosion by providing a stabilized soil surface on a commercial beef feedlot with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.) – Apply and maintain water as a dust suppressant		From Rule 800: Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.	Imperial's fugitive BMPs are listed here for convenience from Imperial Rule 800, but more information on the procedure and implementation is in Fugitive dust benchmarking. Chemical Stabilization/ Suppression: A means of Fugitive Dust (PM-10) control implemented to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other materials approved for use by the California Air Resources Board (CARB), U.S. Environmental Protection Agency (U.S. EPA) and/or the APCO. Gravel: Gravel travelways shall have a three (3)	– Track out control - Minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road – Pavement - To pave currently unpaved areas – Gravel- Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained – Dust suppressants-Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional Requirements – R8011: Dust Suppressants: includes water, hygroscopic materials and, chemical/organic stabilization/suppression materials. – Access restriction - To restrict public access to private roads – Speed reduction- Enforcement of speeds that reduce visible dust emissions – Appropriate equipment and

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Beef Feedlot Specific BMPs					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit; F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))	inch minimum depth Stabilized Surface. The travelway shall have a relative compaction of not less than 95% as determined by Test Method No. California 216 of State of California, Business and Transportation Agency Department of Transportation, and conforming to [certain grading listed in the rule].	Vehicles - Using trip appropriate vehicles
Unpaved Roads or Feed Lanes (A.A.C. R18-2-611.03(E)(4)(a)-(i))	– Install engine speed governors on feed truck to 15 mph – Install signage to limit vehicle speed to 15 mph Install speed control devices – Restrict access to through traffic – Apply and maintain pavement in high traffic areas (more than 20 vehicle trips per day from 2 or more axle vehicles.) – Apply and maintain aggregate cover (aggregate cover means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads or feed lanes. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.) – Apply and maintain synthetic particulate suppressant ("Synthetic particulate suppressant" means reducing PM emissions and wind erosion by providing a stabilized soil surface on a commercial beef feedlot with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.) – Apply and maintain water as a dust suppressant – Apply and maintain oil on roads or feed lanes	"Unpaved roads or feed lanes" is the mandated statutory language in A.R.S. 49-457, and the rules were written to match that language as much as possible. However, in A.A.C. rule, "unpaved roads or feed lanes" means roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation. The definition of unpaved roads or feed lanes encompasses both unpaved roads and feed lanes. It has	((((Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel;	Imperial's fugitive BMPs are listed here for convenience from Imperial Rule 800, but more information on the procedure and implementation is in Fugitive dust benchmarking. Chemical Stabilization/ Suppression: A means of Fugitive Dust (PM-10) control implemented to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other materials approved for use by the California Air	– Speed reduction - Enforcement of speeds that reduce visible dust emissions – Access restriction - To restrict public access to private roads – Pavement - To pave currently unpaved areas – Gravel - Placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained – Dust suppressants-Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional Requirements R8011: Dust Suppressants: includes water, hygroscopic materials and, chemical/organic

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Beef Feedlot Specific BMPs					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 217 (2006), Policy 38, and Rule 420)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
		been generally understood in the past and present that whether a source is an unpaved road or a feed lane, if it is a source of dust, then it must be controlled. The rule is written to require controls on both sources, and to clarify in the case that a feed lane may also be called an "unpaved road" or vice versa. The word "or" in the term does not indicate that only one type of road or the other must be controlled.	F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit; F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))	Resources Board (CARB), U.S. Environmental Protection Agency (U.S. EPA) and/or the APCO. Gravel: Gravel travelways shall have a three (3) inch minimum depth Stabilized Surface. The travelway shall have a relative compaction of not less than 95% as determined by Test Method No. California 216 of State of California, Business and Transportation Agency Department of Transportation, and conforming to [certain grading listed in the rule].	stabilization/suppression materials. – Appropriate equipment and Vehicles - Using trip appropriate vehicles

FIII-10 Commercial Poultry

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Poultry Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
Arenas, Corrals, and Pens (Housing) (A.A.C. R18-2-611.03(F)(1)(a)-(e))	– Clean fans, louvers, and soffit inlets in a commercial poultry facility (means cleaning fans, louvers, and soffit inlets when the facility is empty between depopulating and populating the facility – Use no bedding ("Use no bedding in the production facility" means reducing PM emissions by not using bedding such as wood shavings, sawdust, peanut hulls, straw, or other organic material) – Control vegetation on building exteriors (means removing, cutting, or trimming vegetation that accumulates PM and restricts ventilation of the building, so as to leave approximately 3 feet between the vegetation and building.) – Add moisture through ventilation systems (means using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while maintaining a minimum of 20% moisture in to the air within the housing system to bind small particles to larger particles) – House in fully enclosed ventilated buildings (utilizing fully enclosed buildings with sufficient ventilation.)				– Vegetation- Maintaining some vegetation, such as native grasses, on vacant land – Dust suppressants-Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional Requirements – (R8011: Dust Suppressants: includes water, hygroscopic materials and, chemical/organic stabilization/suppression materials.) – Windblocks - To establish a perimeter physical barrier to reduce windblown dust. – Reduced tillage - To reduce the number of tillings
Animal Waste (and Feed) Handling and Transporting (A.A.C. R18-2-611.03(F)(2)(a)-(k))	**Remove spilled feed** (means removing spilled feed from the housing facility at least once every 14 days.) **Store feed** (means storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage.) **Add oil and/or moisture to the feed** (means adding a minimum of 1% edible oil and/or moisture to feed rations to bind small particles to larger particles.) **Use enclosed feed distribution system** (means using an enclosed feed conveyance system that distributes feed rations throughout the housing facility, which reduces air contact with the feed rations during feed conveyance.) **Use flexible discharge spout** (means using a flexible discharge spout on the end of the feed truck transfer auger.) **Minimize drop distance** (means designing the feed distribution system so that the distance the feed ration drops from the feed distribution system into feeders is approximately 1 foot or less, which reduces air contact with the feed rations during feed conveyance.) **Enclose transfer points** (means enclosing the points of transfer				– Outdoor storage – use of a structure design to store the bulk materials (e.g. used poultry litter/manure) or to securely cover the bulk materials if it must be stored outdoors not within any structure – Boot or sock – feed is loaded into the feed storage bins by employing a sock or boot on the feed delivery truck auger – Cleanout frequency – to adjust the frequency of cleanouts from the houses – Time of manure spreading – to spread the manure at a time that would help reduce the amount of PM10 released in the air

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Poultry Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
	between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduce air contact with the feed rations during feed conveyance.) **Clean floors and walls in a commercial poultry facility** (means cleaning floors and walls to prevent dried manure, spilled feed, and debris accumulation when the facility is empty between depopulating and populating the facility.) **Clean aisles between cage rows** (means cleaning the aisles between cage rows at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.) **Stack separated manure solids** (means reducing the amount of exposed surface area of manure solids.) **Maintain moisture in manure solids** (means maintaining a moisture content of a minimum of 15% in the solids sufficient to bind small particles to larger particles)				
Unpaved Access Connections (A.A.C. R18-2-611.03(F)(3)(a)-(d))	– Install speed control devices – Restrict traffic access – Install and maintain a track-out control system – Install signage to limit vehicle speed to 15 mph		((((Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access;	Imperial's fugitive BMPs are listed here for convenience from Imperial Rule 800, but more information on the procedure and implementation is in Fugitive dust benchmarking. Chemical Stabilization/ Suppression: A means of Fugitive Dust (PM-10) control implemented to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other materials approved for use by the California Air Resources Board	– Access restriction – to restrict public access to private roads – Pavement – to pave currently unpaved areas – Speed reduction - Enforcement of speeds thatreduce visible dust emissions – Gravel – placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained – Dust suppressants-Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional Requirements R – 8011: Dust Suppressants: includes water, hygroscopic materials and, chemical/organic stabilization/suppression materials.

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Poultry Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit;	(CARB), U.S. Environmental Protection Agency (U.S. EPA) and/or the APCO. Gravel: Gravel travelways shall have a three (3) inch minimum depth Stabilized Surface. The travelway shall have a relative compaction of not less than 95% as determined by Test Method No. California 216 of State of California, Business and Transportation Agency Department of Transportation, and conforming to [certain grading listed in the rule].	– Track out control - minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road – Vegetation - To establish or maintain natural vegetation

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Poultry Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
			F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))		
Unpaved Roads or Feed Lanes (A.A.C. R18-2-611.03(F)(4)(a)-(h))	– Install engine speed governors on feed trucks to 15 mph – Install signage to limit vehicle speed to 15 mph – Install speed control devices – Restrict traffic access – Apply and maintain aggregate cover (means applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads or feed lanes. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.) – Apply and maintain synthetic particulate suppressant ("Synthetic particulate suppressant" means reducing PM emissions and wind erosion by providing a stabilized soil surface on a commercial poultry operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.) – Apply and maintain water – Apply and maintain oil on roads or feed lanes	"Unpaved roads or feed lanes" is the mandated statutory language in A.R.S. 49-457, and the rules were written to match that language as much as possible. However, in A.A.C. rule, "unpaved roads or feed lanes" means roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation.	((((Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and	Imperial's fugitive BMPs are listed here for convenience from Imperial Rule 800, but more information on the procedure and implementation is in Fugitive dust benchmarking. Chemical Stabilization/ Suppression: A means of Fugitive Dust (PM-10) control implemented to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other materials approved for use by the California Air Resources Board (CARB), U.S. Environmental Protection Agency (U.S. EPA) and/or the APCO. Gravel: Gravel travelways shall have a three (3) inch minimum depth Stabilized Surface. The travelway shall have a relative compaction of	– Speed reduction – enforcement of speeds that reduce visible dust emissions – Access restriction – reduces vehicle traffic and thus reduces particulates emissions – Gravel – placing a layer of gravel with enough depth to minimize dust generated from vehicle movement and to dislodge any excess debris which can become entrained – Pavement – to pave currently unpaved areas – Dust suppressants-Application of any non-toxic chemical or organic dust suppressant which meets any specification required by any federal, state, or local water agency and is not prohibited for use by any applicable regulations. See Regulation VIII for additional Requirements – R8011: Dust Suppressants: includes water, hygroscopic materials and, chemical/ organic stabilization/suppression materials. – Vegetation- to establish or maintain natural vegetation – Track out control – minimize any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Poultry Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
		The definition of unpaved roads or feed lanes encompasses both unpaved roads and feed lanes. It has been generally understood in the past and present that whether a source is an unpaved road or a feed lane, if it is a source of dust, then it must be controlled. The rule is written to require controls on both sources, and to clarify in the case that a feed lane may also be called an "unpaved road" or vice versa. The word "or" in the	Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit; F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))	not less than 95% as determined by Test Method No. California 216 of State of California, Business and Transportation Agency Department of Transportation, and conforming to [certain grading listed in the rule].	

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Poultry Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (Rule 4550 CMP List)**
		term does not indicate that only one type of road or the other must be controlled.			

FIII-11 Commercial Swine

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Swine Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (None)**
Arenas, Corrals, and Pens (Housing) (A.A.C. R18-2-611.03(G)(1)(a)-(g))	– House in fully enclosed ventilated buildings (means utilizing fully enclosed buildings with sufficient ventilation.) – Use no bedding (means not using bedding such as wood shavings, sawdust, peanut hulls, straw, or other organic material.) – Use slatted floor system ("Slatted flooring" means reducing PM emissions by using flooring that is a slotted concrete or wire-mesh floor set above a liquid manure collection pit, which allows the excrement to fall though the flooring into the liquid pit below, which prevents solids build-up. Slats 4 to 8 inches wide with spacing of about 1 inch in between are recommended.) – Use sloped concrete flooring ("Sloped concrete flooring" means reducing PM emissions by pouring concrete with a minimum of 0.25% grade inside of the barns which provides drainage and easier cleaning of floor areas.) – Clean fans, louvers, and soffit inlets in a commercial swine facility (means cleaning fans, louvers, and soffit inlets between transfer of animal groups, but in any case, at least every 6 months.) – Control vegetation on building exteriors (means removing, cutting, or trimming vegetation that accumulates PM and restricts ventilation of the building, so as to leave approximately 3 feet between the vegetation and the building) – Add moisture through ventilation systems (means using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while maintaining minimum of 15% moisture in the air within the housing system to bind small particles to larger particles.)		No swine-specific controls, but AZ listed controls are similar to other kinds of facilities, e.g. beef feedlots		No swine-specific controls, but AZ listed controls are similar to other kinds of facilities, e.g. beef feedlots

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Swine Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (None)**
Animal Waste (and Feed) Handling and Transporting (A.A.C. R18-2-611.03(G)(2)(a)-(m))	– Remove spilled feed (removing spilled feed from the housing facility at least once every 14 days) – Store feed (storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage) – Add oil and/or moisture to feed Use enclosed feed distribution system (adding a minimum of 0.5% edible oil and/or moisture to feed rations to bind small particles to larger particles.) – Use flexible discharge spout (reducing PM emissions and wind erosion at the time of bulk feed deliveries to the housing units by using a flexible discharge spout on the end of the feed truck transfer auger.) – Minimize drop distance (designing the feed distribution system so that the distance the feed ration drops from the feed distribution system into feeders is 3 feet or less, which reduces air contact with the feed rations during feed conveyance.) – Enclose transfer points (enclosing the points of transfer between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduces air contract with the feed rations during feed conveyance) – Clean pens, floors, and walls in a commercial swine facility (cleaning pens, floors, and walls between transfer of animal groups to prevent dried manure, spilled feed, and debris accumulation, but in any case, at least every 6 months.) – Clean aisles between pens and stalls (cleaning the aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.) – Store separated manure solids in a wind-blocked area (storing manure solids in a wind-blocked area behind a wall, structure, or area with natural wind protection to minimize blowing air movement over the manure stack.) – Stack separated manure solids (reducing the amount of exposed surface area of manure solids.) – Maintain moisture in manure solids (maintaining a minimum moisture content of 10 % in the solids sufficient to bind small particles to larger particles.) – Maintain liquid lagoon level (“Lagoon” means a liquid manure storage and treatment pond.)				

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Swine Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (None)**
Unpaved Access Connections (A.A.C. R18-2-611.03(G)(3)(a)-(d))	– Install speed control devices – Restrict traffic access – Install and maintain a track-out control system – Install signage to limit vehicle speed to 15 mph		From Rule 800: Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust BMPs are listed here for convenience, but more information on the procedure and implementation is in Fugitive dust benchmarking.suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures:	Imperial's fugitive BMPs are listed here for convenience from Imperial Rule 800, but more information on the procedure and implementation is in Fugitive dust benchmarking. Chemical Stabilization/ Suppression: A means of Fugitive Dust (PM-10) control implemented to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other materials approved for use by the California Air Resources Board (CARB), U.S. Environmental Protection Agency (U.S. EPA) and/or the APCO. Gravel: Gravel travelways shall have a three (3) inch minimum depth Stabilized Surface. The travelway shall have a relative compaction of not less than 95% as determined by Test Method No. California 216 of State of California, Business and Transportation Agency Department of Transportation, and conforming to [certain	

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Swine Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (None)**
			F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit; F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))	grading listed in the rule].	
Unpaved Roads or Feed Lanes (A.A.C. R18-2-611.03(G)(4)(a)-(i))	– Install engine speed governors on feed trucks to 15 mph – Install signage to limit vehicle speed to 15 mph – Install speed control devices – Apply and maintain aggregate cover – Apply and maintain synthetic particulate suppressant – Apply and maintain water – Apply and maintain oil on roads or feed lanes	"Unpaved roads or feed lanes" is the mandated statutory language in A.R.S. 49-457, and the rules were written to match that	(((Unpaved Roads and Unpaved Vehicle/Equipment Traffic Area. The dust control plan shall be implemented on all days that traffic exceeds, or is expected to exceed, the number of average daily vehicle trips per day as specified in sections F.5.c.1 and F.5.c.2 of this rule, except where measures are demonstrated by owner/operator to be prohibited by federal or state laws, regulations, or approved plans concerning wilderness preservation and species	Imperial's fugitive BMPs are listed here for convenience from Imperial Rule 800, but more information on the procedure and implementation is in Fugitive dust benchmarking.	

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Swine Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (None)**
		language as much as possible. However, in A.A.C. rule, "unpaved roads or feed lanes" means roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation. The definition of unpaved roads or feed lanes encompasses both unpaved roads and feed lanes. It has been generally understood in the past and present that whether a source is an unpaved road or a feed lane, if it is a source of dust, then it must be controlled. The rule is written to	management and recovery. F.5.c.1 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved road segment, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.1.1 Watering; F.5.c.1.2 Uniform layer of washed gravel; F.5.c.1.3 Paving; F.5.c.1.4 Restrict access; F.5.c.1.5 Restrict speed limit at or below 15 mph; F.5.c.1.6 Chemical/organic dust suppressants; F.5.c.1.7 Roadmix; F.5.c.1.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road. F.5.c.2 On each day of an Off-Road Event and/or Competition that 50 average vehicle daily trips per day will occur on an unpaved surface area dedicated to any vehicle parking and Unpaved Traffic Area, the owner/operator shall limit VDE to 20% opacity and comply with the requirements of a stabilized unpaved road by application and/or re-application/maintenance of at least one of the following control measures: F.5.c.2.1 Watering; F.5.c.2.2 Uniform layer of washed gravel; F.5.c.2.3 Paving; F.5.c.2.4 Restricted access below the limit; F.5.c.2.5 Restrict speed limit at or below 15 mph; F.5.c.2.6 Chemical/organic dust suppressants; F.5.c.2.7 Roadmix; F.5.c.2.8 Any other method(s) that can be demonstrated that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.))))	Chemical Stabilization/ Suppression: A means of Fugitive Dust (PM-10) control implemented to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other materials approved for use by the California Air Resources Board (CARB), U.S. Environmental Protection Agency (U.S. EPA) and/or the APCO. Gravel: Gravel travelways shall have a three (3) inch minimum depth Stabilized Surface. The travelway shall have a relative compaction of not less than 95% as determined by Test Method No. California 216 of State of California, Business and Transportation Agency Department of Transportation, and conforming to [certain grading listed in the rule].	

Animal Operations Agency Comparisons (Rules A.A.C. R18-2-611 and 611.03)					
Commercial Swine Facility Specific BMPs (there are no additional program caveats)					
BMP Category within Facility	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rule 800)**	**Comments re: Imperial**	**San Joaquin (None)**
		require controls on both sources, and to clarify in the case that a feed lane may also be called an "unpaved road" or vice versa. The word "or" in the term does not indicate that only one type of road or the other must be controlled.			

FIII-12 Irrigation Districts

General Permit for Irrigation Districts (Rules A.A.C. R18-2-612 and 612.01)					
Overarching Overview					
Overarching Program Requirement	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 800, 805, and 806)**	**Comments re: Imperial**	**San Joaquin (none)**
Purpose	To reduce PM emissions from sources in irrigation districts within PM nonattainment areas.			The canal regulations come from Imperial's general rule for paved and unpaved roads.	
General Program Structure	An irrigation district engaged in a regulated agricultural activity shall annually complete a (feeless) Best Management Practices General Permit Record Form wherein the district representative will choose to implement a best management practice for each category under the rule. Every three years the district will also complete and submit a survey including, among other things, best management practices chosen and the mileage of district controlled sources of PM. Irrigation districts will maintain records to demonstrate compliance.				
Basic Definitions	"Unpaved operation and maintenance roads" means unpaved roadways that lay adjacent to canals, which provide access for irrigation district personnel and equipment for direct operation and maintenance of canals, and are under the control of the irrigation district. "Unpaved utility access roads" means unpaved roadways used to provide access to canals, and also includes office and shop facilities, equipment yards, staging areas and other lands under the control of the irrigation district. "Canals" means facilities constructed for the sole purpose of the control, conveyance, and delivery of water. These facilities may be either open earthen channels, lined or unlined, or buried pipelines, which are used to convey water uphill and under obstructions, such as roadways and wash and river channels. These facilities include, but are not limited to, gate, inlet, outlet, safety, and measuring structures required to control water along the canals and deliver water to irrigation district customers, as well as compacted earthen banks constructed to protect these facilities from storm runoff events.		CANAL BANK: A rise of land on either side of an irrigation canal. UNPAVED ROADS: Streets, alley ways, or roadways that are not covered by one of the following: concrete, asphaltic concrete, asphalt, or other similar materials specified by the U.S.EPA, CARB and/or the APCO. C.45 UNPAVED TRAFFIC AREA: Any nonresidential area that is: C.45.a Not covered by asphalt, recycled asphalt, asphaltic concrete, concrete, or concrete pavement, and C.45.b Used for fueling and servicing; shipping, receiving and transfer; or parking or storing equipment, haul trucks, vehicles, and any conveyances.	Rules 805 and 806 direct reader to find definitions in rule 800. (There is no definition for "canal road")	
BMP Exceptions	A person may develop different BMPs from those listed in the rule and may submit such practices that are prove4n effective through on-farm demonstration trials to the [Agricultural Best Management Practices] Committee…[but] the newly developed BMPs are not effective unless submitted as described in A.R.S. §49-457(L) which states: L. The committee may periodically reexamine, evaluate and modify		In addition to the exemptions listed in Rule 800, Section E, the following exemptions are established for this Rule: D.1 Paved and unpaved driveways serving one single family residential dwelling.		

General Permit for Irrigation Districts (Rules A.A.C. R18-2-612 and 612.01)					
Overarching Overview					
Overarching Program Requirement	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 800, 805, and 806)**	**Comments re: Imperial**	**San Joaquin (none)**
	best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.		D.2 Agricultural Operation Sites subject to Rule 806, Conservation Management Practices. D.3 Recreational OHV Use Areas on public lands subject to Rule 800, General Requirements for Control of Fine Particulate Matter (PM-10).		
General Permit Record Form	The Best Management Practices General Permit Record Form is to be completed annually. The form shall include the contact information for and signature of representatives responsible and the best management practices selected for unpaved operation and utility roads, canals, and unpaved utility access roads.		n/a		
BMP Survey	The 3-year Survey shall include the following information: 1.The name, business address, and phone number of the irrigation district representative responsible for the preparation and implementation of the best management practices; 2.The signature of the irrigation district representative and the date the form was signed; 3.The total miles of canals that the irrigation district controls; 4.The total miles of unpaved operation and maintenance roads; 5.The total miles of the unpaved utility access roads; and 6.The best management practices selected for unpaved operation and utility roads, canals, and unpaved utility access roads. .		n/a		
Maintaining Records/Compliance	An irrigation district shall maintain records demonstrating compliance (including records of any changes to BMPs) with the applicable rules for three years. ADEQ shall document noncompliance with the applicable rules before issuing a compliance orders. An irrigation district that is not in compliance with the applicable rules is subject to the provisions in A.R.S. § 49-457(I), (J), and (K)		Any Person subject to the requirements of this rule (Rule 805) shall compile and retain records that provide evidence of control measure application (i.e., receipts and/or purchase records). Such Person shall describe, in the records, the type of treatment or control measure, extent of coverage, and date applied. For control measures which require multiple daily applications, recording the frequency of application will fulfill the recordkeeping requirements of this rule (i.e., water being applied three times a day and the date) Records shall be maintained and be readily accessible for two years after the date of each entry and shall be provided to the APCD upon request. Failure to comply with any provisions of this rule shall constitute a violation of Regulation VIII.		

Irrigation BMPs					
BMP Category	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 800, 805, and 806)**	**Comments re: Imperial**	**San Joaquin (none)**
Unpaved operation and maintenance roads	a. Access restriction, b. Apply and maintain aggregate cover, c. Install supervisory control system to limit vehicle travel, d. Limit activity, e. Install signage to limit vehicle speed to 25 mph, f. Post warning signs for unauthorized use at point of entry to roads, g. Reduce vehicle speed, h. Install and maintain a track-out control system, i. Apply and maintain synthetic or natural particulate suppressant, j. Apply and maintain water before, during, and after major and minor earth moving activities, k. Apply and maintain water when grading roadways, l. Use paved non-district or paved public roads to access structures, or m. Install wind barriers.	Reduce vehicle speed means to reducing speed so as not to exceed 25 mph. The speed is at 25 mph because with approximately 900 miles (see Table 5-12 of Appendix B [the EI TSD]) of road to traverse to ensure the passage of water, the irrigation districts advised the Agricultural BMP Committee that it would make extremely difficult to operate if they were only able to travel 15 miles in one hour. In blockage situations, or other daily operations, it may be necessary to travel long distances, and the districts decided that any lower mandated speed would make their jobs technically infeasible. Unpaved road dust from canal roads makes up a relatively small portion of the inventory, about 1.2% overall (and just 15% of total uncontrolled road dust from unpaved private roads). Taking into account the reduction to 25 MPH already included in the rule, ADEQ estimates that further reduction to 15 MPH would yield less than 60 additional TPY of reductions, and would not in any significant way speed the West Pinal nonattainment area towards attainment. Besides which, 15 mph would be a BACM level speed, not necessarily a RACM level speed.	Canal Roads: all Persons who cause, suffer or allow the operation, use or maintenance of any Canal Road with 20 or more Average Vehicle Trips per Day shall comply with one or more of the requirements of Section F.1 to comply with the requirements of a Stabilized Unpaved Road and limit VDE to 20% opacity, as determined by the test methods in Rule 800, Appendix A, and shall also comply with one or more of the requirements of Section F.2. CANAL ROADS: F.2.a Stocking of Triploid Grass Carp in canals to reduce maintenance vehicle trips along Canal Banks to mechanically remove aquatic weeds. F.2.b Installation of remote control delivery gates to eliminate manual gate operation by maintenance personnel in vehicles along Canal Banks. F.2.c Implement Silt removal program to delay grading of spoil piles deposited on Canal Bank after cleaning operations until the next cleaning operation to eliminate vehicle access to Canal Bank. F.2.d Permanent road closure. F.2.e Conversion of open canals to pipeline. F.2.f Lining canals to eliminate maintenance for Silt/weed control. F.2.g Canal Bank surface maintenance.	Appendix A of Rule 800: Visual Determination of Opacity Section A: Test Method for Unpaved Roads and Unpaved Traffic Areas Section B Test Method for Time-Averaged Regulations (opacity)	

General Permit for Irrigation Districts (Rules A.A.C. R18-2-612 and 612.01)					
Irrigation BMPs					
BMP Category	**West Pinal County**	**Comments re: West Pinal**	**Imperial (Rules 800, 805, and 806)**	**Comments re: Imperial**	**San Joaquin (none)**
Canals	a. Dredge canals while muck or debris is still wet, b. Dispose of muck or debris while still damp, c. Weed management, d. Biological control of aquatic weeds, or e. Apply and maintain water before, during and after major and minor earth moving activities.		See "unpaved maintenance and operation roads" above.		
Unpaved utility access roads	a. Access restriction, b. Apply and maintain aggregate cover, c. Limit activity, d. Install signage to limit vehicle speed to 25 mph, e. Post warning signs for unauthorized use at points of entry to roads, f. Reduce vehicle speed, g. Install and maintain a track-out control system, h. Apply and maintain pavement, i. Apply and maintain synthetic or natural particulate suppressant, j. Apply and maintain water before, during and after major and minor earth moving activities, k. Apply and maintain water when grading roadways, l. Use paved non-district or paved public roads to access structures, or n. Install wind barriers. Apply and maintain water when grading roadways, l.		Unpaved Haul/Access Roads: No Person shall cause, suffer or allow the operation, use, or maintenance of any unpaved Haul/Access Road without complying with one or more of the requirements of Section F.1 so as to limit VDE to 20% opacity. Unpaved Roads: On any Unpaved Road segment with 50 or more Average Vehicle Trips per Day, the owner/operator shall limit VDE to 20% opacity, as determined by the test methods for "Visual Determination of Opacity" in Rule 800, Appendix A, and comply with the requirements of a Stabilized Unpaved Road by application and/or maintenance of at least one of the requirements of Section F.1. Unpaved Traffic Areas: All Persons who cause, suffer or allow the operation, use or maintenance of any Unpaved Traffic Area larger than one (1) acre and with 75 or more Average Vehicle Trips per Day shall comply with one or more of the requirements of Section F.3 and limit VDE to 20% opacity. UNPAVED ROADS, INCLUDING UNPAVED HAUL AND ACCESS ROADS: F.1.a Pave. F.1.b Apply Chemical Stabilization as directed by product manufacturer to control dust on Unpaved Roads. F.1.c Apply and maintain Gravel, recrushed/recycled asphalt or other material of		

General Permit for Irrigation Districts (Rules A.A.C. R18-2-612 and 612.01)					
Irrigation BMPs					
BMP Category	West Pinal County	Comments re: West Pinal	Imperial (Rules 800, 805, and 806)	Comments re: Imperial	San Joaquin (none)
			low Silt (<5%) content to a depth of three or more inches. F.1.d Wetting. Apply water one or more times daily F.1.e Permanent road closure F.1.f Restrict unauthorized vehicle access. F.1.g Any other method that effectively limits VDE to 20% opacity and meets the conditions of a Stabilized Unpaved Road. UNPAVED TRAFFIC AREAS: F.3.a Pave. F.3.b Apply Chemical Stabilization as directed by product manufacturer to control dust on Unpaved Roads. F.3.c Apply and maintain Gravel, recrushed/recycled asphalt or other material of low silt (<5%) content to a depth of three or more inches. F.3.d Wetting. Apply water one or more times daily.		

Exhibit F-IV – Fugitive Dust Comparison

Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM10 Moderate Nonattainment Area Fugitive Dust, to Measures Adopted in Other Areas

In Exhibit F-IV, the Pinal County Fugitive Dust Rule is compared to applicable BACM requirements adopted for the Imperial County Air Pollution Control District (ICAPCD) in California. For some Pinal County rule sections, comparison is also made with applicable BACM requirements implemented in the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD) in California, Clark County (CC), Nevada, Maricopa County (MC), Arizona, and with requirements in a Phoenix area (Maricopa County) RACM FIP (40 CFR 52.128).

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
General Applicability			
PCCR 4-1-010. General Applicability	Controls fugitive dust from non-traditional sources throughout the West Pinal PM_{10} nonattainment area: – Open areas/vacant lots – Unpaved roads – Unpaved parking lots – Paved public roadways	The Phoenix FIP, 40 CFR 52.128, has specific regulations for nontraditional sources of PM because rules at the time were not seen as sufficient: – Unpaved parking lots – Unpaved roads – Vacant lots Maricopa County has separate rules for construction. Maricopa does not have the statutory authority to regulate agricultural practices. Rule 310.01 applies to non-traditional sources of fugitive dust such as disturbed open areas, unpaved parking lots, and unpaved roads. Imperial County Rules 800-806 are generally applicable to any active operation, and/or man-made/caused condition or practice capable of generating fugitive dust. Active operations: – Activities capable of generating fugitive dust,	Pinal County and the Agricultural BMP committee have developed rules specific to construction and agricultural operations for fugitive dust caused by those operations in the West Pinal Nonattainment Area. The Fugitive Dust Rule applies to sources not covered under the Agriculture and Construction Rules.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		including but limited to those listed below – Earthmoving activities – Construction activities – Unpaved roads – Trackout/carryout – Bulk material storage and transport – Unpaved haul/access roads San Joaquin Regulation VIII rules are applicable to specified outdoor fugitive sources such as: – Carryout and trackout – Open areas – Paved roads – Unpaved roads – Unpaved vehicle and equipment traffic (lots for large special events) South Coast's fugitive dust Rule 403 applies to any activity or man-made condition capable of generating fugitive dust. The County has a separate Rule 1186 applicable to specified land uses: – Paved roads – Unpaved roads – Livestock operations	
Exemptions			
PCCR 4-1-015.	– Legitimate vehicle test and	FIP exemptions are case specific	In general, the Pinal County rule is

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
Exemptions	development operations – Emergency response acitivity by utility or government agency to restore critical function or to prevent public injury. Does not apply in cases of poor design, operation, and lack of maintenance. – Normal commercial farm cultural practices (precluded by statute and already covered in State agricultural regulations) – Construction operations (already covered by another construction specific rule) – Landscaping without mechanized equipment (except grading or trenching) – Sports and ensuing field use	within different source categories. [40 CFR 52.128(c)] Maricopa County's Rule 310.01 does not apply to: – Agricultural practices (precluded by statute) – dust generating operations otherwise covered in Rule 310 – Emergency activities enacted to prevent public injury or to restore critical utilities – Landscaping without mechanized equipment (except grading or trenching) – Sports and ensuing field use [MC Rule 310.01(103)] San Joaquin Rules: – Carryout and trackout caused by agricultural sources – On-field agricultural sources – Emergency activities (see definitions) performed to ensure health and safety (except those lasting more than 30 days as long as regulation would not limit emergency activity effectiveness) – Activity by essential service utilities, up to an hour after	consistent with other areas in that it exempts sources covered by other rules (e.g. construction and agriculture), non-mechanized landscaping, sport, and emergency activities.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		completion of activity – Activities conducted at 3,000 + ft above sea level – Any weed abatement activity utilizing mowing and/or cutting, and which leaves at least three inches of stubble immediately after such mowing/cutting has occurred. – Various exemptions for paved and unpaved road, unpaved vehicle/equipment traffic areas. [SJVAPCD Rules 8011(4.0), 8041(4.0), 8051(4.0), 8061(4.0), 8071(4.0)] Imperial County Rules: – Actions required by Fed. or State endangered species act or court order or agency order – Off-field agricultural sources necessary to responds to adverse effects on crops during freezing – Emergency maintenance of flood control channels and water spreading basins – Emergency operation activities to ensure public health and safety (except	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		those lasting more than 30 days as long as regulation would not limit emergency activity effectiveness) – Permitted blasting operations – Specific military training activities – Agricultural Operations subject to Rule 806, Conservation Management Practices, are exempt from specified track-out, paved and unpaved road, and open area requirements. – Any operation that operates no more than 10 days within a 90 days period is exempt from specified track-out requirements. – Paved and unpaved driveways serving one single family residential dwelling. [ICAPCD Rules 800(E), 803(D), 804(D), 805(D)] South Coast Fugitive Dust Rule: – Diary farms – CAFOs one acre or less – Crop operations 10 acres or less – Crop operations w/in the South Coast Air Basin more than 10 acres provided	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		certain conditions – Emergency life-threatening situations or declared disaster or state of emergency – Active operations by essential utilities during outages and emergency disruptions – Any contractor subsequent to the time the contract ends, provided the contractor implemented the required control measures during contract period – Weed abatement operations ordered by a governmental entity provided mowing maintains weeks at least 3 inches above soil and any discing where water is used appropriately to prevent destabilization – Sandblasting operations [SCAQMD Rule 403(g)] South Coast Rule for Paved and Unpaved Roads and Livestock Operations: – Public services in compliance with District Rule 403 – Source specific and case	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		specific and/or threshold exemptions – Livestock operations whose contiguous bounded areas do not exceed 10 acres – Road shoulders as long as the area extending 8 ft from the pavement is landscaped and maintained with vegetative cover [SCAQMD Rule 1186(g)]	
Definitions (selected)			
PCCR 4-1-020. Definitions	**DUST SUPPRESSANT** – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.	San Joachin Rule Dust Suppressants includes: water, hygroscopic materials, chemical stabilizers, and suppression materials (see also Definition 3.4 "Chemical Stabilization/Suppression." [SJVAPCD Rule 8010(3.7)] Chemical Stabilization/Suppression: a means of dust control implemented by any person to mitigate PM-10 emissions by applying petroleum resins, asphaltic emulsions, acrylics, adhesives, or any other approved materials. [SJVAPCD Rule 8010(3.4)] Imperial County Construction rules do not explicitly define dust suppressant. Chemical Stabilization/Suppression definition	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		similar to San Joaquin. [ICAPCD Rules 800 and 801]	
	EMERGENCY– Sudden and reasonably unforeseeable events, including acts of God, requiring immediate corrective action causing unavoidable increases in emissions…does not include applicability to improperly designed equipment, lack of maintenance, careless or improper operation, or operator error.	Maricopa County Rule 310.01– sudden and reasonably unforeseeable events, including acts of God, requiring immediate corrective action causing unavoidable increases in emissions…does not include applicability to improperly designed equipment, lack of maintenance, careless or improper operation, or operator error. [MC Rule 310.01(210)] San Joaquin Rule 8011– Emergency activities are basically immediate government action necessary to protect public and timing makes rules impractical to follow. [SJVAPCD Rule 8011(3.14)] No definition in Imperial County Rule 804, Open Areas or Rule 805, Paved and Unpaved Roads but term is employed in the General Requirements Rule. [ICAPCD Rule 800(E)]	Pinal's definition is restrictive to only those absolutely unavoidable instances, similar to Maricopa's definition.
	OPEN AREAS/VACANT LOTS – - unsubdivided or undeveloped tract of land whether or not it is adjoining a developed or a partially	Similar to the OPEN AREAS definition in Imperial County Rule 800(C.29), the Pinal rule includes language that unsubdivided or undeveloped tracts do not have to be	Pinal County rule is applicable in urban and rural areas resulting in greater coverage than found in the San Joaquin and Maricopa BACM rules.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	developed residential, industrial, institutional, governmental, or commercial area. - subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature. - partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.	adjoining a developed or a partially developed area. The San Joaquin Rule 8011(3.36) and Maricopa Rule 310.01(221) exclude these "rural" areas from controls.	
	PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.		
	PAVED PUBLIC ROADWAY– a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either: a. An on-going maintenance	Imperial Rule 805 and San Joaquin Rule 8061 include both public and private paved roadways. However, controls differ for each, depending on whether the roadway is new, modified, or existing. [ICAPCD Rules 800(C.31), 805(B), and 805(F.4). SJVAPCD Rules 8011(3.43) and 8061(5.1).]	The Pinal County paved public roadway definition is consistent with the application of controls for unpaved public roads in the Phoenix RACM FIP.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	obligation for the roadway; or b. A title or easement for the roadway.	The Phoenix area RACM FIP limits control of unpaved roads to roads owned by governmental or quasi-governmental agencies. [40 CFR 52.128(b)(18)]	
	PINAL COUNTY DUST CONTROL FORECAST– a forecast, to identify a low, moderate or high risk of dust generation considering: - Wind speed and direction, - Stagnation, - Recent precipitation, and - Potential for precipitation, - Existing pollutant concentrations, and - historic recorded concentrations during similar conditions	No reviewed rules applicable to the covered source categories contained provisions for risk forecasting.	The Pinal County rule provides a strategy for implementing preventive controls prior to high wind or stagnant meteorological conditions (see Rule Section 4-1-030(2)).
	STABILIZED – As used in this Article, means any previously DISTURBED SURFACE AREA which, through the application of CONTROL MEASURES, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.	Imperial Rule 800 defines "Stabilized Surface" and "Stabilized Unpaved Road." Stabilized Surface must meet one of the specified conditions: visible crust, listed threshold friction velocity, flat vegetative cover of at least 50 percent, standing vegetative cover of at least 30 percent, etc. Stabilized road visible dust is limited to 20% opacity. [ICAPCD Rule 800(C.37) and 800(C.38)]	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	UNPAVED LOT– any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved parking lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.	Phoenix RACM FIP– privately or publicly owned or operated area utilized for parking vehicles that is not paved and is not a Low Use Unpaved Parking Lot. [40 CFR 52.128(b)(17)] Imperial County Rule 800 unpaved traffic area definition includes parking, storage, and conveyances. [ICAPCD Rule 800(C.45)] San Joaquin Rule 8071 unpaved vehicle/equipment traffic area definition excludes residential areas. [SJVAPCD Rule 8011(3.66)] Maricopa Rule 310.01 – same definition for unpaved parking lots. [MC Rule 310.01(230)]	Pinal rule definition is broader in scope than the RACM FIP to explicitly apply to storage, maneuvering, and handling areas.
	UNPAVED ROAD– any roads, equipment paths, or travel ways that are not PAVED. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.	The Phoenix RACM FIP defines as and limits control of unpaved roads to roads owned by governmental or quasi-governmental agencies. [40 CFR 52.128(b)(18)] Maricopa Rule 310.01 only addresses public unpaved roads. [MC Rule 310.01(231)] Imperial Rule 805 and San Joaquin Rule 8061 both apply to public and private unpaved roads, however,	The Pinal County definition and applicability for unpaved public roads is consistent with the Phoenix RACM FIP and Maricopa County SIP. Private agricultural and irrigation district roads and construction roads are included in control strategies contained in separate rules applicable to the West Pinal planning area (see Sections 4.1 and 4.2).

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		control requirements depend on whether the road is new or existing. [ICAPCD Rules 800(C.44), 805(B), and 805(E). SJVAPCD Rules 8011(3.64), 8061(2.0), and 8061(5.2).]	
Standards			
PCCR 4-1-030(1) General Requirements	• The OWNER AND/OR OPERATOR of applicable sources is subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule. • The OWNER AND/OR OPERATOR is required to implement applicable CONTROL MEASURES. • CONTROL MEASURES are required to be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category. • Failure to implement CONTROL MEASURES as required by the rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.		
PCCR 4-1-030(2) Open	Visible Emissions and Stabilization	South Coast Rule 403: no visible	Pinal County visible emissions

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
Areas/Vacant Lots	Requirements: limits opacity of fugitive dust to 20%. Test method per § 4-9-340 or equivalent approved by control officer and EPA.	dust beyond property line, or 20% opacity if dust due to motorized vehicle. [SCAQMD Rule 403(d)] Imperial County Rule 804: 20% opacity. [ICAPCD Rule 804(E.1)] San Joaquin Rule 8051: 20% opacity. [SJVAPCD Rule 8051(5.0)] Maricopa County Rule 310.01: no visible emissions beyond property line. [MC Rule 310.01(302.4) and 310.01(302.5)] Clark County Rule 90: visible crust etc. [CC Rule 90(90.2.1.2)] Phoenix RACM FIP: visible crust etc. [40 CFR 52.128(b)(16)]	requirements are as or more stringent than other district BACM rules.
	Upon evidence of trespass requires installation of no trespass signs or effective physical barriers (curbs, fences, gates, posts, shrubs, trees, etc.)	San Joaquin rule 8051: upon evidence of trespass, no time frame; similar measures. [SJVAPCD Rule 8051(5.0)] Imperial County rule 804: 30 day timeframe after initial discovery; similar controls. [ICAPCD Rule 804(E.2)] Phoenix RACM FIP: 60 days after initial determination of disturbance; physical barrier or stabilization (e.g.	Pinal rule requires owner/operator vigilance (“upon evidence” vs. “after discovery”).

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West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		gravel). [40 CFR 52.128(d)(4)(iii)]	
	Open Areas/Vacant Lots 1.0 acre or larger with 0.5 acre or larger Disturbed Surface Area are required to apply one Control Measure to stabilize: - water or dust suppressant - vegetation - pavement - gravel - chemical/organic stabilizers/suppressants - alternative approved by EPA	Imperial County Rule 804: any open area 0.5 acres or more within urban areas or 3.0 acres or more within rural areas and contains at least 1000 square feet (0.02 acre) of disturbed surface area; similar controls. [ICAPCD Rule 804(B) and 804(F)] San Joaquin Rule 8051: rule applies to any open area having 0.5 acres or more within urban areas, or 3.0 acres or more within rural areas; and contains at least 1000 square feet of disturbed surface area; similar controls. [SJVAPCD Rule 8051(5.0)] Maricopa County Rule 310.01: threshold for certain control elements on open areas and vacant lots 0.10 acre (4,356 square feet) or larger and have a cumulative of 500 square feet or more that are disturbed; similar measures. [MC Rule 310.01(302.4) and 310.01(302.5)] Clark County Rule 90: applicable to OPEN AREAS AND VACANT LOTS that are 5,000 square feet or larger and are disturbed by any means; specifies surface gravel or dust palliatives for motor vehicle	The Pinal County applicability threshold is generally larger than reviewed urban area strategies, however, because the Pinal County threshold is the same for urban and rural areas, the rule likely obtains greater coverage and emissions reductions than most BACM in rural areas. The West Pinal nonattainment area has a comparatively larger rural portion than some other areas (e.g., Maricopa/Phoenix) so the rural coverage is relatively more important.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		disturbance. Additional measures (dust mitigation plan) for open areas and vacant lots with cumulative area of 10,000 acres or greater. [CC Rule 90(90.2.1.2) and 90(90.2.2)] South Coast Rule 403: no size threshold. [SCAQMD Rule 403] Phoenix RACM FIP : applies to open areas/vacant lots disturbed by motor vehicle traffic 5,000 square feet or larger and vacant lots (not disturbed by motor vehicles) with 0.5 acre or larger disturbed surface area; similar measures include restoration to natural state and approved alternative. [40 CFR 52.128(d)(4)(ii)]	
	Open Areas/Vacant Lots 1.0 acre or larger with 0.5 acre or larger Disturbed Surface Area. Within 30 days of discovery of disturbance required to receive Pinal County Dust Control Forecast. Required to stabilize area the day before and the day that is forecast as high risk for PM_{10} emissions.	No comparable requirement in Imperial County Rule 804 or San Joaquin Rule 8051.	More stringent than BACM requirements in Imperial County and San Joaquin Valley. Forecast and stabilization requirements target days with the most potential for elevated PM_{10}. Pinal rule requires that open areas/vacant lots be stabilized prior to (the day before) and the day that is forecast to be high risk for dust emissions (includes high wind and stagnation events).

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
			Rule is reliant on the high risk forecast which provides more protection on high risk days when predicted winds may be below a 25 mph threshold (Imperial's construction rule threshhold). According to Arizona Revised Statutes (ARS) § 49-424(11), when developing the forecast, the Department is required to evaluate – (a) Projected meteorological conditions for the nonattainment area, including all of the following: (i) Wind speed and direction. (ii) Stagnation. (iii) Recent precipitation. (iv) Potential for precipitation. (b) Existing concentrations of air pollution at the time of the forecast. (c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
	Prohibits blading, disking, plowing to remove vegetation unless implementing all of the following: - dust suppressant prior to or during weed abatement - prevent trackout - suppressant, gravel, compaction, or alternative measure to stabilize	Phoenix RACM FIP: same measures as Pinal County. [40 CFR 52.128(d)(4)(i)]	The Pinal rule is as stringent as the Phoenix RACM FIP.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	following weed abatement		
	Compliance with stabilization determined by: - visible crust per drop ball test (§ 4-9-320.B.1); or - Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher determined by test method in Article 9 (§4-9-320.B.2); or - Flat vegetation cover equal to at least 50 percent determined by test method in Article 9 (§4-9-320.B.3); or - Standing vegetation cover equal to or greater than 30 percent determined by test method in Article 9 (§ 4-9-320.B.4); or - Standing vegetation cover equal to or greater than 10 percent determined by test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.	Stabilization parameters similar to Phoenix RACM FIP and Maricopa County Rule 310.01 Section 501.3. [40 CFR 52.128(b)(16)]	The Pinal rule is as stringent as the Phoenix RACM FIP.
PCCR 4-1-030(3) Unpaved Lots	An applicable unpaved lot is any unpaved lot greater than 5,000 ft^2 used for parking, maneuvering, material handling, or storing motor	The Phoenix RACM FIP, 40 CFR 52.128, is most similar to this rule. The rule only defines lots for parking vehicles (see definition in PCCR 4-1-	The Pinal County Rule applicability threshold is the same as the RACM FIP but does not include the FIP exemption for low use parking lots.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	vehicles and equipment. Owner/Operator shall : 1. not cause opacity to exceed 20% AND shall not allow silt loading to equal or exceed .33 oz/ft2 but if it does, owner or operator shall not allow silt content to exceed 8%; and 2. shall implement control measures sufficient to maintain a stabilized surface. (pave, dust suppressant including water and chemical stabilizers, gravel, alternative approved by EPA).	020 above) and exempts lots 5,000 ft^2 or less. The FIP requires 20% opacity and application of controls (pave, chemical stabilizers, gravel, or approved alternative). [40 CFR 52.128(b)(17), 52.128 (c), and 52.128 (d)] The rule also includes exemptions for low use parking lots on days when 10 or fewer vehicles enter a lot; non-routine or emergency maintenance of flood control channels and basins; vehicle test and development. Owners and operators of unpaved parking lots when vehicles are parked no more than 35 days per year, shall implement one of the listed control measures on day(s) in which over 100 vehicles enter the lot. [40 CFR 52.128(b)(8), 52.128(b)(17), 52.128 (c), and 52.128 (d)] Maricopa Rule 310.01 contains the same definition for unpaved parking lots. Maricopa has different control measures for lots used 35 plus days/year versus lots used less than 35days/year. Also, residential areas are treated differently and have a 3,000 ft^2 applicability threshold. [MC Rule 310.01(302.6)]	

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West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		San Joaquin's Rule 8071 exempts unpaved vehicle and equipment traffic areas with less than 50 Average Annual Daily Trips (AADT) from control. For other areas, applicable measures include watering, gravel, chemical stabilizers, and paving. Notification and stabilization measures apply for special events with 1,000 + vehicles (Section 5.1.4).	
PCCR 4-1-030(4) Unpaved Roads	A. The owner and/or operator of UNPAVED ROADS with average daily trips (ADT) greater than 150 (A traffic count shall measure MOTOR VEHICLE traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. MOTOR VEHICLE traffic shall be measured continuously during each 24-hour period.) is subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the CONTROL MEASURES described in 4-1-030.4.A.ii: i. Visible Emissions Requirements and Stabilization Requirements: The Owner and/or Operator of UNPAVED ROADS shall not cause or allow visible fugitive dust	<u>Applicability Threshold</u> San Joaquin Rule 8061: Control threshold of 26 or more Annual Average Daily Trips (AADT). Threshold does not apply to incremental paving of existing unpaved roads. [SJVAPCD Rule 8061(4.0)] South Coast Rule 1186: Unpaved roads that have greater than the average ADT of all unpaved roads in its jurisdiction. [SCAQMD Rule 1186(d)(5)] Imperial County Rule 805: Unpaved road segment with 50 or more Average Vehicle Trips per Day. [ICAPCD Rule 805(E.2) and (E.7)]	<u>Applicability Threshold</u> The Phoenix RACM FIP (40 CFR 52.128) contains an average daily traffic (ADT) threshold of 250. Reviewed BACM level rules range from 26 to 150 vehicles per day. The Pinal County 150 ADT threshold is at a level between those found in reviewed RACM and BACM rules. <u>Visible Emissions and Stabilization</u> The Pinal County rule is as stringent as reviewd RACM and BACM rules. <u>Control Measures and Compliance Schedule</u> Consistent with the Phoenix RACM FIP and South Coast Rule 1186, measures in the PinalCounty Fugitive Dust Rule are applicable to public

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft2, then the owner and/or operator shall not allow the silt content to exceed 6%; ii. CONTROL MEASURES: a. Pave; or b. Apply and maintain DUST SUPPRESANTS other than water; or c. Uniformly apply and maintain surface gravel B. CONTROL MEASURE(s) in 4-1-030.4.A.ii shall be considered effectively implemented when: i. One of the CONTROL MEASURES described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of UNPAVED ROADS having ADT of 150 or more. a. When the CONTROL MEASURE	Maricopa County Rule 310.01: Unpaved roads and Alleys with 150 vehicle trips per day. [MC Rule 310.01(302.7)] Clark County Rule 91: Existing unpaved roads with 150 vehicles per day; "non-federal" requirement for roads below threshold. [CC Rule 91(91.2.1.1.1)] Phoenix RACM FIP: Unpaved roads with ADT of 250 or greater. [40 CFR 52.128(d)(3)] <u>Visible Emissions and Stabilization</u> San Joaquin Rule 8061: Rule limits emissions to 20 percent opacity for roads with 26 or more AADT. [SJVAPCD Rule 8061(5.2)] South Coast Rule 1186: No opacity limit. [SCAQMD Rule 1186] Imperial County Rule 805: Rule limits emissions to 20 percent opacity for roads with 50 or more average vehicle trips per day. [ICAPCD Rule 805(E.2)] Maricopa County Rule 310.01: 20% opacity; does not allow silt loading equal to or greater than 0.33 oz/ft2.	unpaved roads (see definition of unpaved road at PCCR 4-1-020 above). Measures applicable to private unpaved roads are included in the Pinal County Construction and Agricultures Rules (see Sections 4.1 and 4.2). The Pinal County rule contains an incremental implementation schedule which is satisfied when control measures are applied on 15 miles of road annually. Some BACM rules require any listed control on roads above the established threshold with incremental paving of selected public roads. Others require a tiered approach for application of controls which are incrementally applied over a number of years (e.g., South Coast Rule 1186). See Section 4.3.7 for further discussion of Pinal County's unpaved road provisions. <u>Equivalence Method</u> Other reviewed rules did not contain an equivalence method. The equivalency method allows for more flexibility but is still just as stringent, since it produces the same emissions reductions. It's comparable to a 1-to-1 offset credit system.

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West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	is application and maintenance of DUST SUPPRESANTS other than water, the application and maintenance of the DUST SUPPRESANTS shall only be counted towards the 15 mile threshold when: 1. Done on UNPAVED ROADS previously untreated, and 2. Application and maintenance of DUST SUPPRESANTS on UNPAVED ROADS previously treated continues annually until the UNPAVED ROAD is paved. ii. For year 2019 and beyond, CONTROL MEASURES applied on UNPAVED ROADS with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion. [see rule for conversion table]	However, if silt loading is equal to or greater than 0.33 oz/ft2, then the owner and/or operator shall not allow the silt content to exceed 6%. [MC Rule 310.01(302.7)] Clark County Rule 91: 20% opacity. [CC Rule 91(91.2.1.4)] Phoenix RACM FIP: 20% opacity; similar silt loading requirements. [40 CFR 52.128(b)(16)] <u>Control Measures and Compliance Schedule</u> San Joaquin Rule 8061: Includes measures for *existing* public and private unpaved roads above threshold. Requires compliance with stabilization measures: watering, gravel, stabilizers/suppressants, roadmix, paving, or other approved method. Includes a schedule to pave an average of 20 percent annually of all *existing* public unpaved roads. Must show incremental progress on paving (average of 20% annually up to 5 miles in any urban area). Rule also requires a maximum speed limit of 25 mph on each unpaved road with 26 AADT. Prohibits construction of new unpaved roads in urban areas (5.2.2). [SJVAPCD Rule	

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		8061(5.2)] South Coast Rule 1186: The owner/operator of unpaved public roads is required to pave minimum of 1 mile, chemically stabilize 2 miles, speed restrictions (signage, speed bumps) on 3 miles. Applied each year of 8 year period (per owner/operator); treatment in excess of annual requirement can be credited toward future year. [SCAQMD Rule 1186(d)(5)] Imperial County Rule 805: Imperial Rule 805 applies to any *new* or *existing* public or private Unpaved Road. Requires compliance with stabilization measures: pave, chemical stabilizers, watering, gravel, road closure, or other approved method. Includes a schedule to pave an average of 10 percent annualy of all *existing* public unpaved roads. Prohibits construction of new unpaved roads in urban areas. [ICAPCD Rule 805(E.2), (E.3), and (E.7)] Maricopa County Rule 310.01: Pave, dust suppressants other than water, gravel. Control measures effectively implemented when unpaved roadway	

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		meets visible emissions and stabilization requirements or listed control measures are implemented and maintained on 5 miles of unpaved roadway (within one calendar year). [MC Rule 310.01(302.7)] Clark County Rule 91: Pave, dust palliative, or alternative approved by EPA. Restrictions on new unpaved roads. Graduated implementation schedule (1/3, 2/3, 3/3) of eligible roadways dependant on year built and geographic area. [CC Rule 91(91.2.1.1.1) and (91.2.1.3)] Phoenix RACM FIP: Pave, stabilizers, gravel. Implemented on all eligible public roadways by date certain (2 years). [40 CFR 52.128(d)(3)]	
PCCR 4-1-030(5) Paved Public Roadway	<u>Deposition on Road/Trackout</u> Upon discovery of mud/dirt on a paved public roadway that extends 50 feet or more from the nearest unpaved surface exit, the owner or operator *of the property from which the deposition came* from shall, within 24 hours of the discovery, remove the dirt/mud from the paved public roadway and restrict traffic, if necessary, until the material can be	<u>Deposition on Road/Trackout</u> San Joaquin's rule 8061 regulates the agency with the primary responsibility of clean-up, where as Pinal regulates the owner and/or operator of the land from which the trackout or erosion came. San Joaquin's mandates following dust minimizing practices during removal, where as Pinal avoids any	<u>Deposition on Road/Trackout</u> Pinal's trackout section of the rule is based on San Joaquin's rule 8061 section 5.1.3 and Maricopa's rule 310.01. <u>Road Shoulders</u> The Pinal County rule requires stabilization of road shoulders similar to South Coast's measures for road shoulder maintenance.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
	removed. Material should be removed so as not to cause another source of dust. If conditions are unsafe to restrict traffic and removal isn't possible due to weekend or holiday, time to remove may be extended. <u>Road Shoulders</u> The OWNER AND/OR OPERATOR of any existing PAVED PUBLIC ROADWAYs shall take the following actions prior to, during and after work on unpaved road shoulders: Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.	ambiguity by saying that in the course of removal of dirt, an owner or operator of the source of dirt must remove it so as not to cause a source of fugitive dust (this is similar to Maricopa's rule). San Joaquin also requires removal of mud/dirt from paved shoulders. [SJVAPCD Rule 8061(5.1.3)] There are two separate Maricopa County rules for erosion caused deposition onto paved roadways (310.01) and for trackout onto paved roadways (310). Maricopa County's rule 310.01 is similar to San Joaquin's and Pinal's rule as it pertains to erosion caused deposition. Maricopa County Rule 310.01 Section 302.9 is similar to the Pinal Rule but requires removal of erosion caused deposition using appropriate control measures prior to the resumption of traffic on the roadway. Rule 310 Section 306.2 is not applicable here. South Coast's Rule 1186 requires any owner or operator of a paved public road to remove visible material within 72 hours of notification and if it cannot be completed within 10 days, the	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		owner/operator shall notify and provide location information and expected clean-up date. Exemption for accumulations on roads with fewer than 500 ADT; closed roads; during a Governor declared State of Emergency, but done as soon as feasible. Government contracts for street sweeping shall use only certified sweeping equipment. [SCAQMD Rule 1186(d)(1) through (d)(4)] <u>Road Shoulders</u> San Joaquin Rule 8061, requires curbing or paving of shoulders for new or modified roads. Alternative includes vegetation or chemical/organic dust suppressants/stabilizers. Controls for *new* or *modified* public or private paved roads include paving or stabilizing shoulders to a width of 4 or 8 feet or to limit of right-of-way whichever is less depending on the AADT. Requires paving or stabilizing 4-foot shoulders for 50 percent of *existing* paved public roads with the highest AADT in urban areas and 25 percent of existing paved public roads with the highest AADT in rural areas. . [SJVAPCD Rule 8061(5.1)]	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		Imperial County Rule 805: Controls for *new* or *modified* public or private paved roads include paving, curbing, vegetation, or chemically stabilizing shoulders to a width of 2, 4, or 6 feet or to limit of right-of-way whichever is less depending on the type of road and annual average daily vehicle trips (AADVT). Includes additional provisions for medians. [ICAQCD Rule 805(F.4)] South Coast Rule 1186: Beginning in January 2006, new construction or widening of paved roads must meet specified curb and shoulder requirements and pave medians (4 or 8 foot shoulder width depending on average daily traffic). [SCAQMD Rule 1186(d)(4)] [South Coast Rule 403 includes BACM measures for road shoulder maintenance (water prior to clearing, chemical suppressants and/or washed gravel to maintain a stabilized surface after shoulder maintenance). Guidance encourages curbing or paving. Applicable to all construction activity sources.] Clark County Rule 93: Requires	

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		paving, curbing, gravel, or dust pallliatives to a width of 4 or 8 feet for new or modified public or private paved roads. Requires reconstruction of existing nonconforming roads within one year. [CC Rule 93(93.2)] RACM in Appendix C.1 of the General Preamble requires curbing and pave or stabilize (chemically or with vegetation) shoulders of paved roads.	
Recordkeeping			
PCCR 4-1-040. Recordkeeping	Any person subject to the requirements of this rule shall compile and retain records that provide evidence of CONTROL MEASURE application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or CONTROL MEASURE, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.	San Joaquin Rule 8011(6.2) - General Requirements: Additional requirements for manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be provided upon request. Imperial County Rule 804(G) Open Areas: Similar recordkeeping requirements. Records shall be provided upon request. Imperial County Rule 805(G) Paved and Unpaved Roads: Similar recordkeeping requirements. Records shall be provided upon request. Clark County SECTION [Rule] 90 (90.3.1): FUGITIVE DUST FROM	The Pinal County rule is generally consistent with other district requirements.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		OPEN AREAS AND VACANT LOTS: Similar recordkeeping requirements. Documents made available within 24 hours of written request. Clark County SECTION 92 (92.5.1): FUGITIVE DUST FROM UNPAVED PARKING LOTS AND STORAGE AREAS: Similar recordkeeping requirements. Documents made available within 24 hours of written request.	
Reporting Requirements			
PCCR 4-1-045. Reporting Requirements	Requires each city, county, or state agency with primary responsibility for any existing PAVED PUBLIC ROADWAY and UNPAVED ROADS to take the following actions: A. By January 30 of each year provide the DISTRICT with a list of all UNPAVED ROADS under its jurisdiction, including data on length of, and ADT (if available) on, each UNPAVED ROAD segment. B. By January 30 of each year, submit to the District a list of UNPAVED ROADS which were paved during the previous year including the total number of UNPAVED ROADS miles and their respective segments.	San Joaquin Rule 8061 - Paved and Unpaved Roads: Requires annual reporting of progress until 2010 then every 2 years. [SJVAPCD Rule 8061(6.2)] Imperial County Rule 805 – Paved and Unpaved Roads: Requires annual reporting of progress until all roads above threshold stabilized (10 years). [ICAPCD Rule 805(E.7)] Maricopa County Rule 310.01: No requirement. Clark County Rule 91: Requires annual reporting of progress until all roads above threshold stabilized (3 years). [CC Rule 91(91.3.3)] Phoenix RACM FIP: Requires	The Pinal County rule is similar to other district requirements.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
		agency survey of progress every three years. [40 CFR 52.128(e)]	
Record Retention			
PCCR 4-1-050. Record Retention	Copies of the records required by 4-1-040 (Recordkeeping) and 4-1-045 (Reporting) of this rule shall be retained for at least two years.	San Joaquin Rule 8011(6.2) - General Requirements: Requires record retention for 1 year after termination of dust generating activities. SAN JOAQUIN RULE 8061(6.2) - PAVED AND UNPAVED ROADS: Also requires reporting of progress every 2 years. Imperial County Rule 804(G) Open Areas: Requires record retention for 2 years. Imperial County Rule 805(G) Paved and Unpaved Roads: Requires record retention for 2 years. Additional progress reporting requirements. Clark County Section [Rule] 90 (90.3.2): Fugitive Dust From Open Areas and Vacant Lots:Requires retension for 1 year. Clark County Section [Rule] 92 (92.5.2): Fugitive Dust From Unpaved Parking Lots and Storage Areas: Requires retention for at least 1 year. Maricopa County Rule 310.01(503): Requires retension of records for at least 2 years.	The Pinal County rule is generally consistent with other district requirements.

Exhibit F-IV: Comparison of Pinal County Code of Regulations (PCCR), Chapter 4, Article 1, West Pinal PM_{10} Moderate Nonattainment Area Fugitive Dust, with Measures Adopted in Other Areas			
West Pinal Rule Section	West Pinal Rule Requirement	Other District Measures	Evaluation
Violations			
PCCR 4-1-060. Violations	Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq. Violation Exemptions: A. The opacity requirements of this rule shall not apply during: i. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements if applicable CONTROL MEASURES are implemented, applied and maintained, and all dust contributing DISTURBED SURFACE AREAs are stabilized. ii. EMERGENCY maintenance of flood control channels and water retention basins if at least 1 applicable CONTROL MEASURE is applied, and maintained.	Imperial County Rule 804(H) Open Areas: Similar requirement. No violation exemption for wind conditions. Imperial County Rule 805(H) Paved and Unpaved Roads: Similar requirement. No violation exemption for wind conditions.	

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Exhibit F-V –Information On a Gallons per Head Standard Providing More Benefits over a Strict Moisture Percentage for Feed Yard Pens

Emailed Attachment from Bas Aja of Arizona Cattlemen's Association

Information on a Gallons per Head Standard Providing More Benefits over a Strict Moisture Percentage for Feed Yard Pens

Background

Between 2009 and 2012 we conducted many different trials on sprinkling water to reduce dust emissions from feed yard pen surfaces, moving alleys and roadways. These trials revolved around varying the amount of water sprinkled, the time of day sprinkled, targeting locations in the pens and spray angle degree. We implemented these various components and then we contrasted them with the actual emission measurements at the monitor. This trial and error study informed us about the most effective amount (depending on meteorological conditions and season), the most effective time of day, and the most effective locations within the pen surface.

Arizona's regulatory scheme for groundwater use in the Pinal Active Management Area (AMA) maintains a strict standard of 20 gallons per day – per head groundwater use for feed yards (ARS Title 45 AMA Rules). This includes water necessary for processing feed, water consumed by livestock and water use for dust suppression. The current experience in feed yards located in Pinal County demonstrates we are right at this conservation limit when we utilize the 3 – 6 gallons per head/per day for pen surface dust suppression. During the highest months of soil evaporation – between May and September – we are pressed up against this conservation limit nearly daily.

While we learned the most effective and efficient methods for suppressing emissions we also learned the physical limits of specifically targeting dust suppression. For instance: we learned that in the late afternoon and evenings most of the emissions were arising from the back of them pens (opposite from the feeding area of the pens). We worked to target these areas to be at peak moisture late in the afternoon and we more specifically targeted these areas with the degree angle (and launch points) that provided the greatest results as measured at the monitor. However, we discovered that we could not just start targeting these areas late in the afternoon as water volume limits, and tight timeframes did not allow us to get the full coverage that best suppressed emissions. Therefore, we begin application of more water earlier in the day to try and "bank" moisture in these areas that cannot all get water sprayed on them between 5:00 and 9:00 pm.

Creating a single number percentage moisture across the full pen surface is not the best method to reduce emissions. As stated earlier it is sub-locations within the pens at certain times of day. In addition, the extreme weather and climate conditions in Arizona during the May to September time frame makes it cost prohibitive and impossible to maintain a single consistent moisture percentage across the full pen surface. This is why we attempt to "bank" moisture in some pens earlier in the day. Creating a single number uniform standard across 100 percent of pen surface would require a 10 percent over application as parts of pen will be under shade, near water source or in areas of high urination - studies demonstrate that in evening it's the back of pens (away from feed source) that create most emissions which get compressed by nighttime lowering of the atmospheric ceiling.

The extreme costs of trying to sample across 6-8 locations of each pen surface (to get a true reading of pen moisture levels this would be required) is prohibitive to maintenance and management. In addition, it is unsafe to expose on foot personnel to over 100 animals that weigh over 1,400 pounds in each pen. Such a program would violate the safety plans of our feed yards.

Appendix G

Rules, Statutes, or Other Documents for Approval

Exhibit G-I:

Certified A.R.S. § 49-424 (2015) Duties of department (revised high risk forecast mandate included)

STATE OF ARIZONA)
) ss:
COUNTY OF MARICOPA)

I Margaret Kiel-Morse hereby certify:
Name

That I am Information Services Librarian of the Arizona State
Title/Division

Library, Archives and Public Records of the State of Arizona;

That there is on file in said Agency the following:

Arizona Revised Statutes Annotated, 2015 Cumulative Pocket Part, containing A.R.S. § 49-424

The reproduction(s) to which this affidavit is attached is/are a true and correct copy of the document(s) on file.

Margaret A. Kiel-Morse
Signature

Subscribed and sworn to before me this 12-11-2015
Date

Signature, Notary Public

My commission expires 11-24-2017.
Date

M. DE LA HOYA
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 24, 2017

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ARIZONA
REVISED STATUTES

ANNOTATED

2015
Cumulative Pocket Part

For Use in 2015–2016

Volume 15C

Title 49

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gulated small municipal separate storm sewer
scharge elimination system stormwater manage-
plication of any ordinance, rule or regulation as

ied in 40 Code of Federal Regulations section
quirements of 40 Code of Federal Regulations

quirements of public education and outreach,
as provided by the clean water act.

ion and except as required by the clean water
rmit from any person with a federal or state
m permit regulating the same activity at the

tion and except as required by 40 Code of
county may not regulate any person or activity
e section 1342(*l*), 40 Code of Federal Regula-
trative code 18-9-A902(G).

n ordinance, rule or regulation pursuant to this
ons prescribed in § 49-255.

uant to an ordinance or rule adopted pursuant
ith the county for use in administering the
lemented pursuant to this section.

, rule or regulation pursuant to this section, a
state a written statement including a summary
er regulation. The summary shall provide the
to contact with questions or comments. The
written statement in the next issue of the
ost to the county. The county shall make the
egulation available to the public at the same
e rule, ordinance or other regulation with the
ubsection. The county shall also comply with
on D, paragraphs 2, 3 and 4.

e, "county" means a county that operates a
stormwater system pursuant to 40 Code of

led by Laws 2009, Ch. 43, § 1.

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of
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uthorize an administrative director for the
371 to perform enforcement duties. If the
a person is in violation of an ordinance, rule
-371 or a permit authorized pursuant to that
take actions consistent with this article and

B. A county that adopts ordinances, rules or regulations pursuant to § 49-371 may enforce those ordinances, rules or regulations as prescribed by §§ 49-261, 49-262 and 49-263 for violations of this article as if this article were referenced in §§ 49-261, 49-262 and 49-263 except for the following:

1. Appeals under § 49-261, subsection D shall be filed in the superior court.

2. Section 49-262, subsections F, G, H, I and J do not apply.

3. Any other section of statute prescribed in § 49-261, 49-262 or 49-263 does not apply.

C. The county's attorney and the county's designated administrative director have the authority prescribed for the attorney general and the director of environmental quality, respectively, pursuant to §§ 49-261, 49-262 and 49-263.

D. Notwithstanding §§ 49-262 and 49-263, penalties obtained pursuant to this article by a county shall be deposited into the county general fund.

E. A county shall not receive civil penalties under this section if an interested person, the United States, this state or another political subdivision or agency of this state has received civil penalties or is diligently prosecuting a civil penalty action in a court of the United States or this state, or in an administrative enforcement proceeding, with respect to the same allegations, standard, requirement or order. This state, and any political subdivision or agency of this state that is or may be affected by a civil, judicial or administrative action, may intervene as a matter of right in any pending civil, judicial or administrative action for purposes of obtaining injunctive or declaratory relief.

Added by Laws 2008, Ch. 192, § 2.

§§ 49-373, 49-374. Repealed by Laws 1998, Ch. 72, § 13, eff. August 21, 1998

Historical and Statutory Notes

The repealed sections, as well as former §§ 49-371 and 49-372, added by Laws 1989, Ch. 280, § 5, amended by Laws 1991, Ch. 161, §§ 1 to 5; Laws 1994, Ch. 95, § 7; Laws 1994, Ch. 128, §§ 4 to 7; Laws 1995, Ch. 88, §§ 6 to 8; Laws 1996, Ch. 252, § 5; Laws 1997, Ch. 130, §§ 14 to 25, related to wastewater facilities financing and the wastewater management authority.

Laws 1998, Ch. 72, § 16, provides:

"Sec. 16. Applicability

"The provisions of this act shall apply to all loan repayment agreements entered into before the effective date of this act."

CHAPTER 3

AIR QUALITY

ARTICLE 1. GENERAL PROVISIONS

Section	
49-401.01.	Definitions.
49-403.	General permits and individual permits; issuance; definition.
49-405.	Attainment area designations.
49-410.	Arizona emissions bank; program termination.
49-411.	Particulate measures; cities, towns, counties, departments; implementation; report.

ARTICLE 2. STATE AIR POLLUTION CONTROL

Section	
49-422.	Powers and duties.
49-424.	Duties of department.
49-427.	Grant or denial of applications; revisions.
49-456.	Technical assistance for small business; compliance advisory panel; panel termination.
49-457.	Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.

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Section
49-457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.
49-457.01. Leaf blower use restrictions and training; leaf blower equipment sellers; informational material; outreach; applicability.
49-457.02. Dust-free developments program; certification; seal.
49-457.03. Off-road vehicles; pollution advisory days; applicability; penalties.
49-457.04. Off-highway vehicle and all-terrain vehicle dealers; informational material; outreach; applicability.
49-457.05. Dust action general permit; best management practices; applicability; definitions.
49-459. State plan; carbon emissions from power plants.

ARTICLE 3. COUNTY AIR POLLUTION CONTROL

49-471.01. Regulatory bill of rights.
49-471.03. Inspections.
49-474.01. Additional board duties in vehicle emissions control areas; definitions.
49-474.05. Dust control; training; site coordinators.
49-474.06. Dust control; subcontractor registration; fee.
49-474.07. Voluntary diesel equipment retrofit program; criteria; inventory; permits.
49-476.01. Monitoring.
49-501. Unlawful open burning; exceptions; civil penalty; definition.

Section
ARTICLE 5. ANNUAL EMISSIONS INSPECTION OF MOTOR VEHICLES

49-541. Definitions.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.05. Alternative fuel vehicles.
49-543. Emissions inspection costs; disposition; fleet inspection; certificates.
49-545. Agreement with independent contractor; qualifications of contractor; agreement provisions.
49-546. Fleet emissions inspection stations; certificates of inspection; dealer's inventory; investigations; revocation or suspension of permit.
49-551. Air quality fee; air quality fund; purpose.
49-554. Technical assistance review.

ARTICLE 7. EMISSIONS CONTROL

49-573. Emissions controls; federal vehicles.

ARTICLE 1. GENERAL PROVISIONS

United States Supreme Court

Environmental regulation, Clean Air Act, preemption, state air quality rules requiring local fleet operators to purchase or lease vehicles meeting state motor vehicle pollution standards, see Engine Mfrs. Ass'n v. South Coast Air Quality Management Dist., 2004, 124 S.Ct. 1756, 541 U.S. 246, 158 L.Ed.2d 529, on remand 367 F.3d 1173.

§ 49-401.01. Definitions

In this chapter, unless the context otherwise requires:

1. "Administrator" means the administrator of the United States environmental protection agency.

2. "Adverse effects to human health" means those effects that result in or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, including adverse effects that are known to be or may reasonably be anticipated to be caused by substances that are acutely toxic, chronically toxic, carcinogenic, mutagenic, teratogenic, neurotoxic or causative of reproductive dysfunction.

3. "Adverse environmental effect" means any significant and widespread adverse effect that may reasonably be anticipated on wildlife, aquatic life, or other natural

resources, including adverse impacts or species or significant degradation of envi

4. "Arizona Grand Canyon visibility the following four mandatory federal cla of recommendations made by the Gra pursuant to the clean air act:

(a) Grand Canyon national park.

(b) Petrified Forest national park.

(c) Sycamore Canyon Wilderness.

(d) Mount Baldy Wilderness.

5. "Arizona mandatory federal class parks and wilderness areas that are de in this state pursuant to the clean air Canyon visibility transport commission

(a) Pine Mountain Wilderness.

(b) Mazatzal Wilderness.

(c) Sierra Ancha Wilderness.

(d) Superstition Wilderness.

(e) Saguaro Wilderness.

(f) Galiuro Wilderness.

(g) Chiricahua Wilderness.

(h) Chiricahua National Monument

6. "Attainment area" means any a regulations promulgated by the admin ambient air quality standards.

7. "Begin actual construction" me activities on an emissions unit which a change in method of operation, this ter preparatory activity, which mark the i

(a) For purposes of title I, parts C for purposes of applicants that requir the application of title I, parts C and activities include installation of buildi ground pipework and construction include any of the following, subject tc

(i) Clearing and grading, including and equipment, stripping and stockpil

(ii) Installation of access roads, dri

(iii) Installation of ancillary struc temporary storage structures, that a unit or associated air pollution contr

(iv) Ordering and on-site storage o

(b) For purposes other than for t this paragraph, these activities do n subsection D:

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2. Maintain an hourly plume report that includes meteorological conditions that affect dispersal of smoke.

3. In consultation with the department of health services and the on-scene coordinator, prepare a report that includes test results of any sampling, including the sampling rationale and protocol and chain of custody report using applicable environmental protection agency standards. The report shall also include, to the extent practicable, a smoke dispersion map with detail adequate to determine possible areas of impact at the level of detail practicable and a listing of likely releases of any chemical that is categorized by the United States environmental protection agency as a hazardous air pollutant and the corresponding environmental protection agency description of possible health effects of the chemical based on a reliable inventory of hazardous materials at the site or facility.

Added as § 36–1702 by Laws 1967, Ch. 2, § 9. Amended by Laws 1971, Ch. 190, § 11; Laws 1973, Ch. 158, § 198. Renumbered as § 49–422 by Laws 1986, Ch. 368, § 37, subsec. C, eff. July 1, 1987. Amended by Laws 1991, Ch. 283, § 4, eff. July 1, 1992; Laws 2000, Ch. 193, § 574; Laws 2000, Ch. 353, § 4, eff. July 18, 2000, retroactively effective to July 1, 2000; Laws 2007, Ch. 153, § 6; Laws 2011, Ch. 291, § 2.

[1] Section 41–1092 et seq.

Historical and Statutory Notes

Reviser's Notes:

2007 Note. Pursuant to authority of § 41–1304.02, in the section heading "and duties; definition" was added and subsection E, paragraph 4 was redesignated as subsection F.

§ 49–424. Duties of department

The department shall:

1. Determine whether the meteorology of the state is such that airsheds can be reasonably identified and air pollution, therefore, can be controlled by establishing air pollution control districts within well defined geographical areas.

2. Make continuing determinations of the quantity and nature of emissions of air contaminants, topography, wind and temperature conditions, possible chemical reactions in the atmosphere, the character of development of the various areas of the state, the economic effect of remedial measures on the various areas of the state, the availability, use and economic feasibility of air-cleaning devices, the effect on human health and danger to property from air contaminants, the effect on industrial operations of remedial measures and other matters necessary to arrive at a better understanding of air pollution and its control. In a county with a population in excess of one million two hundred thousand persons, the department shall locate a monitoring system in at least two remote geographic sites.

3. Establish substantive policy statements for identifying air quality exceptional events that take into consideration this state's unique geological, geographical and climatological conditions and any other unusual circumstances. These substantive policy statements shall be developed with the planning agency certified pursuant to § 49–406, subsection A and the county air pollution control department or district.

4. Determine the standards for the quality of the ambient air and the limits of air contaminants necessary to protect the public health, and to secure the comfortable enjoyment of life and property by the citizens of the state or in any defined geographical area of the state where the concentration of air pollution sources, the health of the population, or the nature of the economy or nature of land and its uses so require, and develop and transmit to the county boards of supervisors minimum state standards for air pollution control.

5. Conduct investigations, inspections a section under the procedures established by

6. Hold hearings relating to any aspec section, and in connection therewith, com production of records under the procedures

7. Prepare and develop a comprehensi control of air pollution in this state.

8. Encourage voluntary cooperation by affected groups or other states to achieve voluntary testing of actual or suspected sou

9. Encourage political subdivisions of t within their respective jurisdictions, and pr consultative assistance therefor.

10. Compile and publish from time t respect to those matters studied and invest

11. Develop and disseminate air qualit PM–10 nonattainment or maintenance are maintenance areas that are designated in 2011. Each forecast shall identify a low, for the next five consecutive days and s forecast is generated. At a minimum, department's website and distributed elec casts, the department shall consider all of

(a) Projected meteorological conditions nance area, including all of the following:

(i) Wind speed and direction.

(ii) Stagnation.

(iii) Recent precipitation.

(iv) Potential for precipitation.

(b) Existing concentrations of air pollut

(c) Historic air pollution concentrations logical conditions similar to those that

Added as § 36–1705 by Laws 1967, Ch. 2, § 9. 1970, Ch. 164, § 27, eff. May 18, 1970; Laws eff. Jan. 1, 1987. Renumbered as § 49–424 subsec. C, 77, eff. July 1, 1987. Amended by Ch. 1, § 22; Laws 1996, 7th S.S., Ch. 6, § 29; § 1.

§ 49–426. Permits; duties of direc tions; fees

Administrative

Air pollution control modifications; permits; permit revisions, see A.A.C. R18–2–1704.

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port that includes meteorological conditions that

epartment of health services and the on-scene
includes test results of any sampling, including
ol and chain of custody report using applicable
standards. The report shall also include, to the
ersion map with detail adequate to determine
evel of detail practicable and a listing of likely
categorized by the United States environmental
ir pollutant and the corresponding environmental
ossible health effects of the chemical based on a
erials at the site or facility.

. 2, § 9. Amended by Laws 1971, Ch. 190, § 11; Laws
§ 49–422 by Laws 1986, Ch. 368, § 37, subsec. C, eff.
., Ch. 283, § 4, eff. July 1, 1992; Laws 2000, Ch. 193,
July 18, 2000, retroactively effective to July 1, 2000;
h. 291, § 2.

al and Statutory Notes

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well defined geographical areas.

ons of the quantity and nature of emissions of air
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feasibility of air-cleaning devices, the effect on
ty from air contaminants, the effect on industrial
nd other matters necessary to arrive at a better
l its control. In a county with a population in
thousand persons, the department shall locate a
emote geographic sites.

statements for identifying air quality exceptional
this state's unique geological, geographical and
ther unusual circumstances. These substantive
d with the planning agency certified pursuant to
unty air pollution control department or district.

the quality of the ambient air and the limits of
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y by the citizens of the state or in any defined
re the concentration of air pollution sources, the
ure of the economy or nature of land and its uses
it to the county boards of supervisors minimum
trol.

5. Conduct investigations, inspections and tests to carry out the duties of this section under the procedures established by this article.

6. Hold hearings relating to any aspect of or matter within the duties of this section, and in connection therewith, compel the attendance of witnesses and the production of records under the procedures established by § 49–432.

7. Prepare and develop a comprehensive plan or plans for the abatement and control of air pollution in this state.

8. Encourage voluntary cooperation by advising and consulting with persons or affected groups or other states to achieve the purposes of this chapter, including voluntary testing of actual or suspected sources of air pollution.

9. Encourage political subdivisions of the state to handle air pollution problems within their respective jurisdictions, and provide as it deems necessary technical and consultative assistance therefor.

10. Compile and publish from time to time reports, data and statistics with respect to those matters studied and investigated by the department.

11. Develop and disseminate air quality dust forecasts for the Maricopa county PM–10 nonattainment or maintenance area and any other PM–10 nonattainment or maintenance areas that are designated in this state from and after December 31, 2011. Each forecast shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. At a minimum, the forecasts shall be posted on the department's website and distributed electronically. When developing these forecasts, the department shall consider all of the following:

(a) Projected meteorological conditions for the PM–10 nonattainment or maintenance area, including all of the following:

(i) Wind speed and direction.

(ii) Stagnation.

(iii) Recent precipitation.

(iv) Potential for precipitation.

(b) Existing concentrations of air pollution at the time of the forecast.

(c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

Added as § 36–1705 by Laws 1967, Ch. 2, § 9. Amended by Laws 1969, Ch. 53, § 16; Laws 1970, Ch. 164, § 27, eff. May 18, 1970; Laws 1973, Ch. 158, § 200; Laws 1986, Ch. 319, § 1, eff. Jan. 1, 1987. Renumbered as § 49–424 and amended by Laws 1986, Ch. 368, §§ 37, subsec. C, 77, eff. July 1, 1987. Amended by Laws 1992, Ch. 299, § 10; Laws 1993, 6th S.S., Ch. 1, § 22; Laws 1996, 7th S.S., Ch. 6, § 29; Laws 2011, Ch. 214, § 1; Laws 2014, Ch. 86, § 1.

§ 49–426. Permits; duties of director; exceptions; applications; objections; fees

Administrative Code References

Air pollution control modifications; permits; permit revisions, see A.A.C. R18–2–1704.

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Exhibit G-II:

House Bill 2125, Amending A.R.S. § 49-424 (Fifty-first Legislature, Second Regular Session, 2014, Chapter 86) (reflecting changes from most recent approved version)

House Engrossed

State of Arizona
House of Representatives
Fifty-first Legislature
Second Regular Session
2014

CHAPTER 86

HOUSE BILL 2125

AN ACT

AMENDING SECTION 49-424, ARIZONA REVISED STATUTES; RELATING TO AIR QUALITY.

(TEXT OF BILL BEGINS ON NEXT PAGE)

Be it enacted by the Legislature of the State of Arizona:

Section 1. Section 49-424, Arizona Revised Statutes, is amended to read:

49-424. Duties of department

The department shall:

1. Determine whether the meteorology of the state is such that airsheds can be reasonably identified and air pollution, therefore, can be controlled by establishing air pollution control districts within well defined geographical areas.

2. Make continuing determinations of the quantity and nature of emissions of air contaminants, topography, wind and temperature conditions, possible chemical reactions in the atmosphere, the character of development of the various areas of the state, the economic effect of remedial measures on the various areas of the state, the availability, use and economic feasibility of air-cleaning devices, the effect on human health and danger to property from air contaminants, the effect on industrial operations of remedial measures and other matters necessary to arrive at a better understanding of air pollution and its control. In a county with a population in excess of one million two hundred thousand persons ~~according to the most recent United States decennial census~~, the department shall locate a monitoring system in at least two remote geographic sites.

3. Establish substantive policy statements for identifying air quality exceptional events that take into consideration this state's unique geological, geographical and climatological conditions and any other unusual circumstances. These substantive policy statements shall be developed with the planning agency certified pursuant to section 49-406, subsection A and the county air pollution control department or district.

4. Determine the standards for the quality of the ambient air and the limits of air contaminants necessary to protect the public health, and to secure the comfortable enjoyment of life and property by the citizens of the state or in any defined geographical area of the state where the concentration of air pollution sources, the health of the population, or the nature of the economy or nature of land and its uses so require, and develop and transmit to the county boards of supervisors minimum state standards for air pollution control.

5. Conduct investigations, inspections and tests to carry out the duties of this section under the procedures established by this article.

6. Hold hearings relating to any aspect of or matter within the duties of this section, and in connection therewith, compel the attendance of witnesses and the production of records under the procedures established by section 49-432.

7. Prepare and develop a comprehensive plan or plans for the abatement and control of air pollution in this state.

8. Encourage voluntary cooperation by advising and consulting with persons or affected groups or other states to achieve the purposes of this

chapter, including voluntary testing of actual or suspected sources of air pollution.

9. Encourage political subdivisions of the state to handle air pollution problems within their respective jurisdictions, and provide as it deems necessary technical and consultative assistance therefor.

10. Compile and publish from time to time reports, data and statistics with respect to those matters studied and investigated by the department.

11. Develop and disseminate air quality dust forecasts for the Maricopa county PM-10 nonattainment OR MAINTENANCE area AND ANY OTHER PM-10 NONATTAINMENT OR MAINTENANCE AREAS THAT ARE DESIGNATED IN THIS STATE FROM AND AFTER DECEMBER 31, 2011. Each forecast shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. At a minimum, the forecasts shall be posted on the department's website and distributed electronically. When developing these forecasts, the department shall consider all of the following:

(a) Projected meteorological conditions for the ~~Maricopa county~~ PM-10 NONATTAINMENT OR MAINTENANCE area, including all of the following:

(i) Wind speed and direction.

(ii) Stagnation.

(iii) Recent precipitation.

(iv) Potential for precipitation.

(b) Existing concentrations of air pollution at the time of the forecast.

(c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

APPROVED BY THE GOVERNOR APRIL 17, 2014.

FILED IN THE OFFICE OF THE SECRETARY OF STATE APRIL 18, 2014.

Exhibit G-III:

History of A.R.S. § 49-457: House Bill 2394, Amending A.R.S. § 49-457 (Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1); A.R.S. § 49-457 (2011); A.R.S. § 49-457 (2005)

House Bill 2394, Amending A.R.S. § 49-457 (Fifty-second Legislature, First Regular Session, 2015,Chapter 243, § 1)

2015 No. 4

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ARIZONA

LEGISLATIVE SERVICE 2015

FIFTY-SECOND LEGISLATURE
First Regular Session
Chapters 221 to 324 (End)

In This Issue

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Governor's Veto Message

Memorials and Resolutions

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See Preface for further information

receive a public report from the seller or lessor pursuant to section 32–2183, subsection I.

Approved by the Governor, April 9, 2015.

Filed in the Office of the Secretary of State, April 10, 2015.

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AIR POLLUTION
CHAPTER 243

H.B. 2394

AN ACT AMENDING SECTION 49–457, ARIZONA REVISED STATUTES; RELATING TO AIR QUALITY.

Be it enacted by the Legislature of the State of Arizona:

Section 1. Section 49–457, Arizona Revised Statutes, is amended to read:

§ 49–457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.

2. The director of the Arizona department of agriculture or the director's designee.

3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

11. One person actively engaged in the operation of a beef cattle feed lot.

12. One person actively engaged in the operation of a dairy.

13. One person actively engaged in the operation of a poultry facility.

14. One person actively engaged in the operation of a swine facility.

15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 15 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to title 38, chapter 4, article 2.

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and

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provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. A person who commences a regulated agricultural activity ~~after December 31, 2000~~ shall immediately comply with the agricultural general permit ~~within eighteen months of commencing the activity~~ prescribed by this section.

H. The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM–10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to section 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM–10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM–10 particulate matter, to demonstrate compliance with applicable provisions of the general permit. Best management practices may vary within the regulated area, according to regional or geographical conditions or cropping patterns.

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and require that the person obtain an individual permit pursuant to section 49–426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other applicable requirements of the clean air act, including section 110(l) of the act (42 United States Code section 7410(l)).

O. The regulation of PM–10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts fur-

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ther regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.

P. For the purposes of this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce PM–10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce PM–10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce PM–10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

(d) ~~Reduces~~ Reduce PM–10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.

(e) Reduce PM–10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:

(i) Unpaved access connections.

(ii) Unpaved roads or feed lanes.

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19 and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Sec. 2. Effective date

Section 49–457, Arizona Revised Statutes, as amended by this act, is effective from and after December 31, 2015.

Approved by the Governor, April 9, 2015.

Filed in the Office of the Secretary of State, April 10, 2015.

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WEIGHTS AND MEASURES

CHAPTER 244

H.B. 2480

AN ACT AMENDING TITLE 3, ARIZONA REVISED STATUTES, BY ADDING CHAPTER 19; PROVIDING FOR TRANSFERRING AND RENUMBERING; AMENDING SECTION 3–102, ARIZONA REVISED STATUTES; AMENDING SECTIONS 3–3401, 3–3413, 3–3414, 3–3418, 3–3431, 3–3433, 3–3434, 3–3451, 3–3453, 3–3454, 3–3471, 3–3472, 3–3473, 3–3475, 3–3492, 3–3493, 3–3494, 3–3495, 3–3496, 3–3512, 3–3513 AND 3–3515, ARIZONA REVISED STATUTES, AS TRANSFERRED AND RENUMBERED; AMENDING SECTIONS 9–499.18, 28–364, 28–5602, 28–5605 AND 28–5936, ARIZONA REVISED STATUTES; AMENDING TITLE 28, ARIZONA REVISED STATUTES, BY ADDING CHAPTER 30; AMENDING TITLE 28, CHAPTER 30, ARIZONA REVISED STATUTES, BY ADDING ARTICLE 2; AMENDING SECTION 41–112, ARIZONA REVISED STATUTES; REPEALING SECTIONS 41–2052, 41–2061 AND 41–3021.02, ARIZONA REVISED STATUTES; RELATING TO WEIGHTS AND MEASURES.

Be it enacted by the Legislature of the State of Arizona:

Section 1. Title 3, Arizona Revised Statutes, is amended by adding chapter 19, to read:

CHAPTER 19

WEIGHTS AND MEASURES SERVICES DIVISION

ARTICLE 1. GENERAL PROVISIONS

ARTICLE 2. STATE ADMINISTRATION OF WEIGHTS AND MEASURES

ARTICLE 3. METHOD OF SALE OF COMMODITIES AND SERVICES

ARTICLE 4. LICENSING, TESTING AND CERTIFICATION

ARTICLE 5. REGULATION

ARTICLE 6. MOTOR FUEL

ARTICLE 7. GASOLINE VAPOR CONTROL

Sec. 2. Transfer and renumber

Title 41, chapter 15, Arizona Revised Statutes, is transferred and renumbered for placement in title 3, Arizona Revised Statutes, as added by this act, as chapter 19. Title 41, chapter 15, articles 1, 2, 3, 4, 5, 6 and 7, Arizona Revised Statutes, are transferred and renumbered for placement in title 3, chapter 19, Arizona Revised Statutes, as added by this act, as articles 1, 2, 3, 4, 5, 6 and 7, respectively. The following section is transferred and renumbered for placement in title 3, chapter 19, article 1:

A.R.S. § 49-457 (2011) Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions (excluding 2015 revisions)

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Title 49

Including Legislation Enacted Through The First Regular Session and
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unless the applicant has corrected the reasons for the objections specified by the director as reasons for such denial.

Added as § 36–1707.02 by Laws 1970, Ch. 164, § 31, eff. May 18, 1970. Amended by Laws 1973, Ch. 158, § 203. Renumbered as § 49–427 and amended by Laws 1986, Ch. 368, § 2, subsec. C, 80, eff. July 1, 1987. Amended by Laws 1990, Ch. 42, § 8; Laws 1992, Ch. 2, § 17, eff. Sept. 1, 1993; Laws 2010, Ch. 315, § 3.

Historical and Statutory Notes

Laws 2010, Ch. 315, § 4, provides:

"Sec. 4. Conditional enactment; revisions to state implementation plan; notice

"A. Sections 49–401.01 and 49–427, Arizona Revised Statutes, as amended by this act, are not effective unless on or before October 1, 2013 the United States environmental protection agency approves revisions to this state's air quality implementation plan that incorporate the changes made by this act.

"B. The director of the department of environmental quality shall promptly provide written notice of the date of that approval or the failure to receive that approval to the director of the Arizona legislative council.

§ 49–457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.

2. The director of the Arizona department of agriculture or the director's designee.

3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

11. One person actively engaged in the operation of a beef cattle feed lot.

12. One person actively engaged in the operation of a dairy.

13. One person actively engaged in the operation of a poultry facility.

14. One person actively engaged in the operation of a swine facility.

15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 15 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to title 38, chapter 4, article 2.[1]

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D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. A person who commences a regulated agricultural activity after December 31, 2000 shall comply with the general permit within eighteen months of commencing the activity.

H. The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM–10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to § 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM–10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM–10 particulate matter, to demonstrate compliance with applicable provisions of the general permit. Best management practices may vary within the regulated area, according to regional or geographical conditions or cropping patterns.

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.[2] The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and require that the person obtain an individual permit pursuant to § 49–426. A revocation becomes effective after the director has provided the

person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other applicable requirements of the clean air act, including section 110(*l*) of the act (42 United States Code section 7410(*l*)).

O. The regulation of PM–10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts further regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.

P. For the purposes of this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce PM–10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce PM–10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce PM–10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

(d) Reduces PM–10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.

(e) Reduce PM–10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:

(i) Unpaved access connections.

(ii) Unpaved roads or feed lanes.

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19[3] and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

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3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Added by Laws 1998, Ch. 217, § 16. Amended by Laws 2007, Ch. 292, § 14; Laws 2009, Ch. 180, § 1; Laws 2010, Ch. 82, § 1; Laws 2010, Ch. 207, § 1; Laws 2011, Ch. 214, § 2.

[1] Section 38–621 et seq.
[2] Section 41–1092 et seq.
[3] Section 48–2901 et seq.

Historical and Statutory Notes

Laws 2007, Ch. 292, § 20, provides:

"Sec. 20. **Interim rule making; publication**

"Notwithstanding title 41, chapter 6, article 3, Arizona Revised Statutes, the best management practices committee for regulated agricultural activities established under § 49–457, Arizona Revised Statutes, shall adopt the rules required by § 49–457, Arizona Revised Statutes, as amended by this act, as interim rules with an immediate effective date in compliance with § 41–1032, Arizona Revised Statutes, in order to comply with the December 31, 2007 deadline imposed by the United States environmental protection agency for failure to attain the national ambient air quality standard for PM–10 on or before December 31, 2006. The rules shall have an immediate effective date. Interim rules are exempt from title 41, chapter 6, article 3, Arizona Revised Statutes, except that the committee shall submit the rules for publication and the secretary of state shall publish the rules in the Arizona administrative register."

Laws 2007, Ch. 292, § 21, relating to public contracts and dust control requirements, was repealed by § 22 of that act effective October 1, 2009."

Laws 2009, Ch. 180, §§ 2 and 3, provide:

"Sec. 2. **Rule making; compliance**

"A. On or before June 30, 2010, the agricultural best management practices committee established by § 49–457, Arizona Revised Statutes, as amended by this act, shall adopt by rule an agricultural general permit that specifies best management practices for regulated agricultural activities to reduce PM–10 particulate emissions from dairy operations, beef cattle feed lot operations, poultry facility operations and swine facility operations.

"B. A person who engages in regulated agricultural activity from a dairy, a beef cattle feed lot, a poultry facility or a swine facility shall comply with the general permit within six months after the effective date of the general permit.

"Sec. 3. **New PM–10 particulate nonattainment areas; best management practices; retroactivity**

"A. Notwithstanding any other statute, a rule or ordinance that is adopted after June

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A.R.S. § 49-457 (2005) (same as approved version)

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JANICE K. BREWER
SECRETARY OF STATE

ARIZONA REVISED STATUTES

ANNOTATED

Prepared Under Legislative Authority
Laws 1956, Chapter 129

Volume 15C

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Title 49
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4. Have staff from the small business stationary source technical and environmental compliance assistance program to develop and disseminate reports and advisory opinions.

Added by Laws 1992, Ch. 299, § 33.

[1] 20 U.S.C.A. § 1221.
[2] 5 U.S.C.A. § 601.
[3] 5 U.S.C.A. § 504.

Historical and Statutory Notes

Laws 1992, Ch. 299, § 63, provides:

"Sec. 63. Initial terms of members of compliance advisory panel

"Notwithstanding § 49–456, Arizona Revised Statutes, as added by this act, the initial terms of members of the compliance advisory panel are:

"1. The appointee of the director of the department of environmental quality shall serve a term ending January 1, 1994.

"2. The appointees of the governor shall serve two terms ending January 1, 1995.

"3. The appointees of the speaker of the house of representatives shall serve two terms ending January 1, 1996.

"4. The appointees of the president of the senate shall serve two terms ending January 1, 1997."

For conditional enactment provision of Laws 1992, Ch. 299, and occurrence of the condition, see Historical and Statutory Notes following § 49–401.01.

Section 41–3003.12, terminating the compliance advisory council on July 1, 2003, and repealing § 49–456 on January 1, 2004, was repealed by Laws 2000, Ch. 56, § 1.

Library References

Environmental Law ⟹268, 290.
Westlaw Topic No. 149E.

§ 49–457. Agricultural best management practices committee; members; powers; permits; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director or the director's designee.

2. The director of the department of agriculture or the director's designee.

3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

C. The governor shall appoint the members designated pursuant to subsection A,[1] paragraphs 5 through 10 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to § 38–611, subsection D.

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. Notwithstanding subsections I, J and K of this section, a person engaged in a regulated agricultural activity on the effective date of this section shall comply with the general permit as provided in subsection H of this section by December 31, 2001. A person who commences a regulated agricultural activity after December 31, 2000, shall comply with the general permit within eighteen months of commencing the activity.

H. By June 10, 2000, the committee shall adopt, by rule, an agricultural general permit specifying best management practices for regulated agricultural activities to reduce pm-10 particulate emissions. A person subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to § 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used to demonstrate compliance with applicable provisions of the general permit no later than December 31, 2001. Best management practices may vary within the Maricopa pm-10 particulate nonattainment area according to regional or geographical conditions or cropping patterns. The director shall submit the rule to the United States environmental protection agency as a revision to the applicable implementation plan within sixty days of adoption.

I. If the director determines that a person engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve upon the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.[2] The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than six months, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule

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pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve upon the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than six months, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and to require that the person obtain an individual permit pursuant to § 49–426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program by June 10, 2000. The education program shall be conducted by the director or the director's designee or designees.

N. In this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce pm-10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce pm-10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce pm-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

2. "Applicable implementation plan" means that term as defined in 42 United States Code 7601(q).[3]

3. "Best management practices" means techniques verified by scientific research, that on a case by case basis are practical, economically feasible and effective in reducing pm-10 particulate emissions from a regulated agricultural activity.

4. "Maricopa pm-10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 code of Federal Regulations part 81.303.

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5. "Regulated agricultural activities" means commercial farming practices that may produce pm-10 particulate emissions within the maricopa pm-10 particulate nonattainment area.

Added by Laws 1998, Ch. 217, § 16.

[1] So in original. Should be "subsection B".

[2] Section 41–1092 et seq.

[3] 42 U.S.C.A. 7601(q).

Historical and Statutory Notes

Reviser's Notes:

1998 Note. Pursuant to authority of § 41–1304.02, in subsection G, first sentence "section" was substituted for "act" and in subsection N the definitions were alphabetized with paragraph 5 renumbered as paragraph 2 and paragraphs 2, 3 and 4 renumbered as paragraphs 3, 4 and 5, respectively.

Administrative Code References

Agricultural PM10 general permit, Maricopa PM10 nonattainment area, see A.A.

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Library References

Environmental Law ⟹290.
Westlaw Topic No. 149E.

Notes of Decisions

Validity 1

1. Validity

Environmental Protection Agency's (EPA) approval of Arizona's general permit rule for agricultural emissions of airborne particulate matter of diameter 10 micrometers or less (PM—10) as best available control measures (BACM) was not arbitrary and capricious under Clean Air Act (CAA), taking into account uncertainties involved in prescribing agricultural rules, measures that Arizona adopted, and process by which Arizona arrived at its best management practices (BMPs); Arizona offered reasoned explanation for choices it made, and EPA was within bounds of its judgment and expertise to approve it. Vigil v. Leavitt, C.A.92004, 2004 WL 1043373. Environmental Law ⟹ 277

§ 49–458. Regional haze program; authority

The department may participate in interstate regional haze programs that are established by the regional planning organization that is authorized for this region pursuant to 40 code of federal regulations part 51, subpart P and the clean air act.

Added as § 49–411 by Laws 2002, Ch. 251, § 2. Renumbered as § 49–414. Renumbered as § 49–458 by Laws 2004, Ch. 129, § 1.

Historical and Statutory Notes

Laws 2004, Ch. 129, § 1, provides:

"**Section 1. Transfer and renumber**"

"Sections 49–414 and 49–414.01, Arizona Revised Statutes, are transferred and renumbered for placement in title 49, chapter 3, article 2, Arizona Revised Statutes, as §§ 49–458 and 49–458.01, respectively."

Reviser's Notes:

2002 Note. Pursuant to authority of § 41–1304.02, this section, added by Laws 2002, Ch. 251, sec. 2 as § 49–411, was renumbered as § 49–414.

Exhibit G-IV:

Certified A.R.S. § 49-457 Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions (2015) (effective January 1, 2016)

(last amended by House Bill 2394, Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1)

STATE OF ARIZONA)
) ss:
COUNTY OF MARICOPA)

I Margaret Kiel-Morse hereby certify:
Name

That I am Information Services Librarian of the Arizona State
Title/Division

Library, Archives and Public Records of the State of Arizona;

That there is on file in said Agency the following:

Arizona Revised Statutes Annotated, 2015 Cumulative Pocket Part, containing A.R.S. §49-457, effective January 1, 2016

The reproduction(s) to which this affidavit is attached is/are a true and correct copy of the document(s) on file.

Signature

Subscribed and sworn to before me this 12-11-2015
Date

Signature, Notary Public

My commission expires 11-24-2017.
Date

M. DE LA HOYA
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 24, 2017

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n ordinance, rule or regulation pursuant to this ons prescribed in § 49-255.

uant to an ordinance or rule adopted pursuant ith the county for use in administering the lemented pursuant to this section.

, rule or regulation pursuant to this section, a state a written statement including a summary er regulation. The summary shall provide the to contact with questions or comments. The written statement in the next issue of the cost to the county. The county shall make the egulation available to the public at the same e rule, ordinance or other regulation with the ubsection. The county shall also comply with on D, paragraphs 2, 3 and 4.

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uthorize an administrative director for the 371 to perform enforcement duties. If the a person is in violation of an ordinance, rule -371 or a permit authorized pursuant to that take actions consistent with this article and

B. A county that adopts ordinances, rules or regulations pursuant to § 49-371 may enforce those ordinances, rules or regulations as prescribed by §§ 49-261, 49-262 and 49-263 for violations of this article as if this article were referenced in §§ 49-261, 49-262 and 49-263 except for the following:

1. Appeals under § 49-261, subsection D shall be filed in the superior court.

2. Section 49-262, subsections F, G, H, I and J do not apply.

3. Any other section of statute prescribed in § 49-261, 49-262 or 49-263 does not apply.

C. The county's attorney and the county's designated administrative director have the authority prescribed for the attorney general and the director of environmental quality, respectively, pursuant to §§ 49-261, 49-262 and 49-263.

D. Notwithstanding §§ 49-262 and 49-263, penalties obtained pursuant to this article by a county shall be deposited into the county general fund.

E. A county shall not receive civil penalties under this section if an interested person, the United States, this state or another political subdivision or agency of this state has received civil penalties or is diligently prosecuting a civil penalty action in a court of the United States or this state, or in an administrative enforcement proceeding, with respect to the same allegations, standard, requirement or order. This state, and any political subdivision or agency of this state that is or may be affected by a civil, judicial or administrative action, may intervene as a matter of right in any pending civil, judicial or administrative action for purposes of obtaining injunctive or declaratory relief.

Added by Laws 2008, Ch. 192, § 2.

§§ 49-373, 49-374. Repealed by Laws 1998, Ch. 72, § 13, eff. August 21, 1998

Historical and Statutory Notes

The repealed sections, as well as former §§ 49-371 and 49-372, added by Laws 1989, Ch. 280, § 5, amended by Laws 1991, Ch. 161, §§ 1 to 5; Laws 1994, Ch. 95, § 7; Laws 1994, Ch. 128, §§ 4 to 7; Laws 1995, Ch. 88, §§ 6 to 8; Laws 1996, Ch. 252, § 5; Laws 1997, Ch. 130, §§ 14 to 25, related to wastewater facilities financing and the wastewater management authority.

Laws 1998, Ch. 72, § 16, provides:

"Sec. 16. Applicability

"The provisions of this act shall apply to all loan repayment agreements entered into before the effective date of this act."

CHAPTER 3

AIR QUALITY

ARTICLE 1. GENERAL PROVISIONS

Section	
49-401.01.	Definitions.
49-403.	General permits and individual permits; issuance; definition.
49-405.	Attainment area designations.
49-410.	Arizona emissions bank; program termination.
49-411.	Particulate measures; cities, towns, counties, departments; implementation; report.

ARTICLE 2. STATE AIR POLLUTION CONTROL

Section	
49-422.	Powers and duties.
49-424.	Duties of department.
49-427.	Grant or denial of applications; revisions.
49-456.	Technical assistance for small business; compliance advisory panel; panel termination.
49-457.	Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.

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Section
49-457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.
49-457.01. Leaf blower use restrictions and training; leaf blower equipment sellers; informational material; outreach; applicability.
49-457.02. Dust-free developments program; certification; seal.
49-457.03. Off-road vehicles; pollution advisory days; applicability; penalties.
49-457.04. Off-highway vehicle and all-terrain vehicle dealers; informational material; outreach; applicability.
49-457.05. Dust action general permit; best management practices; applicability; definitions.
49-459. State plan; carbon emissions from power plants.

ARTICLE 3. COUNTY AIR POLLUTION CONTROL

49-471.01. Regulatory bill of rights.
49-471.03. Inspections.
49-474.01. Additional board duties in vehicle emissions control areas; definitions.
49-474.05. Dust control; training; site coordinators.
49-474.06. Dust control; subcontractor registration; fee.
49-474.07. Voluntary diesel equipment retrofit program; criteria; inventory; permits.
49-476.01. Monitoring.
49-501. Unlawful open burning; exceptions; civil penalty; definition.

Section
ARTICLE 5. ANNUAL EMISSIONS INSPECTION OF MOTOR VEHICLES

49-541. Definitions.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.05. Alternative fuel vehicles.
49-543. Emissions inspection costs; disposition; fleet inspection; certificates.
49-545. Agreement with independent contractor; qualifications of contractor; agreement provisions.
49-546. Fleet emissions inspection stations; certificates of inspection; dealer's inventory; investigations; revocation or suspension of permit.
49-551. Air quality fee; air quality fund; purpose.
49-554. Technical assistance review.

ARTICLE 7. EMISSIONS CONTROL

49-573. Emissions controls; federal vehicles.

ARTICLE 1. GENERAL PROVISIONS

United States Supreme Court

Environmental regulation, Clean Air Act, preemption, state air quality rules requiring local fleet operators to purchase or lease vehicles meeting state motor vehicle pollution standards, see Engine Mfrs. Ass'n v. South Coast Air Quality Management Dist., 2004, 124 S.Ct. 1756, 541 U.S. 246, 158 L.Ed.2d 529, on remand 367 F.3d 1173.

§ 49-401.01. Definitions

In this chapter, unless the context otherwise requires:

1. "Administrator" means the administrator of the United States environmental protection agency.

2. "Adverse effects to human health" means those effects that result in or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, including adverse effects that are known to be or may reasonably be anticipated to be caused by substances that are acutely toxic, chronically toxic, carcinogenic, mutagenic, teratogenic, neurotoxic or causative of reproductive dysfunction.

3. "Adverse environmental effect" means any significant and widespread adverse effect that may reasonably be anticipated on wildlife, aquatic life, or other natural

resources, including adverse impacts or species or significant degradation of envi

4. "Arizona Grand Canyon visibility the following four mandatory federal cla of recommendations made by the Gra pursuant to the clean air act:

(a) Grand Canyon national park.

(b) Petrified Forest national park.

(c) Sycamore Canyon Wilderness.

(d) Mount Baldy Wilderness.

5. "Arizona mandatory federal class parks and wilderness areas that are de in this state pursuant to the clean air Canyon visibility transport commission

(a) Pine Mountain Wilderness.

(b) Mazatzal Wilderness.

(c) Sierra Ancha Wilderness.

(d) Superstition Wilderness.

(e) Saguaro Wilderness.

(f) Galiuro Wilderness.

(g) Chiricahua Wilderness.

(h) Chiricahua National Monument

6. "Attainment area" means any a regulations promulgated by the admin ambient air quality standards.

7. "Begin actual construction" me activities on an emissions unit which a change in method of operation, this ter preparatory activity, which mark the i

(a) For purposes of title I, parts C for purposes of applicants that requir the application of title I, parts C and activities include installation of buildi ground pipework and construction include any of the following, subject tc

(i) Clearing and grading, including and equipment, stripping and stockpil

(ii) Installation of access roads, dri

(iii) Installation of ancillary struc temporary storage structures, that a unit or associated air pollution contr

(iv) Ordering and on-site storage o

(b) For purposes other than for t this paragraph, these activities do n subsection D:

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sions from the activities of a dairy, a beef
ine facility, including practices relating to the

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19[3] and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Added by Laws 1998, Ch. 217, § 16. Amended by Laws 2007, Ch. 292, § 14; Laws 2009, Ch. 180, § 1; Laws 2010, Ch. 82, § 1; Laws 2010, Ch. 207, § 1; Laws 2011, Ch. 214, § 2.

[1] Section 38–621 et seq.
[2] Section 41–1092 et seq.
[3] Section 48–2901 et seq.

§ 49–457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

Section effective Jan. 1, 2016. See, also, section effective until Jan. 1, 2016.

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.

2. The director of the Arizona department of agriculture or the director's designee.

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3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

11. One person actively engaged in the operation of a beef cattle feed lot.

12. One person actively engaged in the operation of a dairy.

13. One person actively engaged in the operation of a poultry facility.

14. One person actively engaged in the operation of a swine facility.

15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 15 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to title 38, chapter 4, article 2.[1]

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. A person who commences a regulated agricultural activity shall immediately comply with the agricultural general permit prescribed by this section.

H. The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM–10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to § 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM–10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM–10 particulate matter, to demonstrate compliance with applicable provisions of the general permit. Best management practices may vary within the regulated area, according to regional or geographical conditions or cropping patterns.

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve on the person by certified mail an order requiring compliance with the general

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permit and notifying the person of the oppor
chapter 6, article 10.[2] The order shall state
of the noncompliance and shall specify that t
determines is reasonable, but is not less th
supervisors of the natural resource cons
engages in the regulated activity that specif
among those adopted in rule pursuant to sub
will use to comply with the general permit.

J. If the director determines that a pers
is not in compliance with the general p
submitted a plan pursuant to subsection I o
the person by certified mail an order requi
and notifying the person of the opportun
chapter 6, article 10. The order shall state
of the noncompliance and shall specify that
determines is reasonable, but is not less t
department that specifies the best managen
in rule pursuant to subsection H of this se
with the general permit.

K. If a person fails to comply with the
of this section, the director may revoke
person and require that the person ob
§ 49–426. A revocation becomes effecti
person with notice and an opportunity for
article 10.

L. The committee may periodically re
agement practices. Any approved modifi
States environmental protection agency as
tion plan.

M. The committee shall develop and
education program shall be conducted by
designees.

N. A best management practice adopt
any applicable requirements in an appli
applicable requirements of the clean air
United States Code section 7410(*l*)).

O. The regulation of PM–10 particula
cultural activities is a matter of state
preempts further regulation of regulate
town or other political subdivision of this

P. For the purposes of this section, u

1. "Agricultural general permit" mea

(a) Reduce PM–10 particulate emissio
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(b) Reduce PM–10 particulate emissio
that are not normally in crop production.

(c) Reduce PM–10 particulate emissio
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iculture of the university of Arizona or the

d States natural resources conservation service

the production of citrus.

the production of vegetables.

the production of cotton.

the production of alfalfa.

the production of grain.

niversity of Arizona college of agriculture.

1 the operation of a beef cattle feed lot.

1 the operation of a dairy.

1 the operation of a poultry facility.

1 the operation of a swine facility.

y a county air quality department or agency.

members designated pursuant to subsection ction for a term of six years. Members may ntitled to compensation for their services but of expenses pursuant to title 38, chapter 4,

irman from the appointed members to serve a

e call of the chairman or at the request of a

al quality, the Arizona department of agricul- he university of Arizona shall cooperate with any necessary information to the committee. lity shall provide the necessary staff support

ulated agricultural activity shall immediately rmit prescribed by this section.

ule, an agricultural general permit specifying record keeping and reporting requirements, o reduce PM-10 particulate emissions. A al general permit pursuant to this section is to § 49-426 except as provided in subsection ll adopt by rule a list of best management be used in areas designated as moderate atter and at least two of which shall be used ainment for PM-10 particulate matter, to le provisions of the general permit. Best the regulated area, according to regional or erns.

person who is engaged in a regulated activity permit, and that person has not previously ed pursuant to this section, the director may order requiring compliance with the general

permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.[2] The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and require that the person obtain an individual permit pursuant to § 49-426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other applicable requirements of the clean air act, including section 110(*l*) of the act (42 United States Code section 7410(*l*)).

O. The regulation of PM-10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts further regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.

P. For the purposes of this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce PM-10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce PM-10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce PM-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

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(d) Reduce PM–10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.

(e) Reduce PM–10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:

(i) Unpaved access connections.

(ii) Unpaved roads or feed lanes.

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19[3] and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Added by Laws 1998, Ch. 217, § 16. Amended by Laws 2007, Ch. 292, § 14; Laws 2009, Ch. 180, § 1; Laws 2010, Ch. 82, § 1; Laws 2010, Ch. 207, § 1; Laws 2011, Ch. 214, § 2; Laws 2015, Ch. 243, § 1, eff. Jan. 1, 2016.

[1] Section 38–621 et seq.
[2] Section 41–1092 et seq.
[3] Section 48–2901 et seq.

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Historical and

Laws 2007, Ch. 292, § 20, provides:

"**Sec. 20. Interim rule making; publication**

"Notwithstanding title 41, chapter 6, article 3, Arizona Revised Statutes, the best management practices committee for regulated agricultural activities established under § 49–457, Arizona Revised Statutes, shall adopt the rules required by § 49–457, Arizona Revised Statutes, as amended by this act, as interim rules with an immediate effective date in compliance with § 41–1032, Arizona Revised Statutes, in order to comply with the December 31, 2007 deadline imposed by the United States environmental protection agency for failure to attain the national ambient air quality standard for PM–10 on or before December 31, 2006. The rules shall have an immediate effective date. Interim rules are exempt from title 41, chapter 6, article 3, Arizona Revised Statutes, except that the committee shall submit the rules for publication and the secretary of state shall publish the rules in the Arizona administrative register."

Laws 2007, Ch. 292, § 21, relating to public contracts and dust control requirements, was repealed by § 22 of that act effective October 1, 2009."

Laws 2009, Ch. 180, §§ 2 and 3, provide:

"**Sec. 2. Rule making; compliance**

"**A.** On or before June 30, 2010, the agricultural best management practices committee established by § 49–457, Arizona Revised Statutes, as amended by this act, shall adopt by rule an agricultural general permit that specifies best management practices for regulated agricultural activities to reduce PM–10 particulate emissions from dairy operations, beef cattle feed lot operations, poultry facility operations and swine facility operations.

"**B.** A person who engages in regulated agricultural activity from a dairy, a beef cattle feed lot, a poultry facility or a swine facility shall comply with the general permit within six months after the effective date of the general permit.

Administrative

Agricultural PM10 general permit, PM10 nonattainment area, see A.A.C. R18–2–610.01.

Exhibit G-V:

Redline Version of Changes from SIP Approved to Current Version of A.R.S. § 49-457

Redline Changes from 1998 SIP Approved Version of A.R.S. § 49-457 to Version Effective January 1, 2016

A.R.S. § 49-457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.
2. The director of the Arizona department of agriculture or the director's designee.
3. The dean of the college of agriculture of the university of Arizona or the dean's designee.
4. The state director of the United States natural resources conservation service or the director's designee.
5. One person actively engaged in the production of citrus.
6. One person actively engaged in the production of vegetables.
7. One person actively engaged in the production of cotton.
8. One person actively engaged in the production of alfalfa.
9. One person actively engaged in the production of grain.
10. One soil taxonomist from the university of Arizona college of agriculture.
11. One person actively engaged in the operation of a beef cattle feed lot.
12. One person actively engaged in the operation of a dairy.
13. One person actively engaged in the operation of a poultry facility.
14. One person actively engaged in the operation of a swine facility.
15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 1~~0~~5 of this section for a term of sixty days~~six years~~. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to ~~§ 38-611, subsection D~~ title 38, chapter 4, article 2.

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. ~~Notwithstanding subsections I, J and K of this section,~~ A person who commences a regulated agricultural activity on the effective date of this section shall immediately comply with the agricultural general permit ~~as provided in subsection H of~~ prescribed by this section.

H. ~~By June 10, 2000,~~ The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM-10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to ~~§~~section 49-

426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM-10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM-10 particulate matter, to demonstrate compliance with applicable provisions of the general permit ~~no later than December 31, 2001~~. Best management practices may vary within the ~~Maricopa PM-10 particulate nonattainment~~regulated area, according to regional or geographical conditions or cropping patterns. ~~The director shall submit the rule to the United States environmental protection agency as a revision to the applicable implementation plan within sixty days of adoption.~~

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve ~~up~~on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.~~2~~ The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than ~~six months~~sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than ~~six months~~sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and ~~to~~ require that the person obtain an individual permit pursuant to ~~§~~section 49-426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program~~ by June 10, 2000~~. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other

applicable requirements of the clean air act, including section 110(l) of the act (42 United States Code section 7410(l)).
O. The regulation of PM-10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts further regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.
P. ~~In~~ For the purposes of this section, unless the context otherwise requires:
1. "Agricultural general permit" means best management practices that:
(a) Reduce PM-10 particulate emissions from tillage practices and from harvesting on a commercial farm.
(b) Reduce PM-10 particulate emissions from those areas of a commercial farm that are not normally in crop production.
(c) Reduce PM-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.
(d) Reduce PM-10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.
(e) Reduce PM-10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:
(i) Unpaved access connections.
(ii) Unpaved roads or feed lanes.
(iii) Animal waste handling and transporting.
(iv) Arenas, corrals and pens.
(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM-10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19 and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:
(i) Unpaved operation and maintenance roads.
(ii) Canals.
(iii) Unpaved utility access roads.
2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).
3. "Best management practices" means techniques that are verified by scientific research~~,~~ and that on a case by case basis are practical, economically feasible and effective in reducing PM-10 particulate emissions from a regulated agricultural activity.
4. "Maricopa PM-10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.
5. "Regulated agricultural activities" means:
(a) Commercial farming practices that may produce PM-10 particulate emissions within the ~~Maricopa pm-10 particulate nonattainment~~regulated area~~.~~, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.
(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.
6. "Regulated area" means any of the following:

(a) The Maricopa PM-10 particulate nonattainment area.
(b) Any portion of area A that is located in a county with a population of two million or more persons.
(c) Any other PM-10 particulate nonattainment area established in this state on or after June 1, 2009.

Exhibit G-VI:

Certified Final Rule - ADEQ Enforced Agricultural Best Management Practices Committee Rules for West Pinal County PM10 Nonattainment Area (Agricultural BMP Rules)

MICHELE REAGAN
Secretary of State
State of Arizona

UNITED STATES OF AMERICA)
) SS.
STATE OF ARIZONA)

I, MICHELE REAGAN, SECRETARY OF STATE, DO HEREBY CERTIFY THAT THE ATTACHED IS A COMPLETE, TRUE, AND CORRECT COPY OF THE FOLLOWING RULES AS PUBLISHED IN THE ARIZONA ADMINISTRATIVE REGISTER, VOLUME 21, ISSUE 30, JULY 24, 2015; AND SCHEDULED TO BE PUBLISHED IN THE 15-3 SUPPLEMENT OF THE ARIZONA ADMINISTRATIVE UPON ITS COMPLETION: R18-2-210, R18-2-610, R18-2-610.01, R18-2-610.02, R18-2-610.03, R18-2-611, R18-2-611.01, R18-2-611.02, R18-2-611.03, R18-2-612, R18-2-612.01, R18-2-613, R18-2-613.01, AND APPENDIX 2.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done this 21st day of December, 2015.

Michele Reagan

MICHELE REAGAN
Secretary of State

1700 W. Washington Street, Fl. 7
Phoenix, Arizona 85007-2808
Telephone (602) 542-4285 Fax (602) 542-1575
www.azsos.gov

NOTICES OF FINAL EXEMPT RULEMAKING

This section of the *Arizona Administrative Register* contains Notices of Final Exempt Rulemaking.

The Office of the Secretary of State is the filing office and publisher of these rules. Questions about the interpretation of the final exempt rule should be addressed to the agency proposing them. Refer to Item #5 to contact the person charged with the rulemaking.

NOTICE OF FINAL EXEMPT RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY AIR POLLUTION CONTROL

[R15-63]

PREAMBLE

1. Article, Part, or Section Affected (as applicable)

Article, Part, or Section Affected (as applicable)	Rulemaking Action
R18-2-210	Amend
R18-2-610	Amend
R18-2-610.01	Amend
R18-2-610.02	New Section
R18-2-610.03	New Section
R18-2-611	Amend
R18-2-611.01	Amend
R18-2-611.02	New Section
R18-2-611.03	New Section
R18-2-612	Repeal
R18-2-612	New Section
R18-2-612.01	New Section
R18-2-613	Repeal
R18-2-613	New Section
R18-2-613.01	New Section
Appendix 2	Amend

2. Citations to the agency's statutory rulemaking authority to include the authorizing statute (general) and the implementing statute (specific), and the statute or session law authorizing the exemption:

Authorizing Statutes: A.R.S. §§ 49-104(A)(10) and 49-404(A)

Implementing Statutes: A.R.S. § 49-457

Implementing Legislative Action: Senate Bill (SB) 1408 (Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1)

Statute or Session Law Authorizing the Exemption: House Bill (HB) 2208 (Fiftieth Legislature, First Regular Session, 2011, Chapter 214, § 4)

3. The effective date of the rule and the agency's reason it selected the effective date:

July 2, 2015. HB 2208 (Fiftieth Legislature, First Regular Session, 2011, Chapter 214, § 4) states that the rule shall be effective immediately upon filing with the Secretary of State.

4. A list of all previous notices published in the *Register* as specified in R1-1-409(A) that pertain to the record of the exempt rulemaking:

Not applicable

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

Name: Heidi M. Haggerty

Address: Arizona Department of Environmental Quality
1110 W. Washington St.
Phoenix, AZ 85007

Telephone: (602) 771-4815 (This number may be reached in-state by dialing 1-800-234-5677 and requesting the seven digit number.)

Fax: (602) 771-2366
E-mail: Haggerty.Heidi@azdeq.gov

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

Summary. This rulemaking, under the authority of Senate Bill (SB) 1408 (Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1), signed by former Governor Brewer on April 16, 2010, expands the applicability of agricultural best management practices (BMPs) under A.R.S. § 49-457, to include the activities of irrigation districts in regulated areas established after June 1, 2009, which includes the Pinal County PM nonattainment area. A.R.S. § 49-457 (P)(1)(f). The BMPs are being added to reduce emissions of particulate matter by including practices related to activities of an irrigation district in moderate nonattainment areas designated after June 1, 2009, and includes BMPs from each of the categories: unpaved operation and maintenance roads, canals, and unpaved utility access roads.

In addition, this rulemaking amends the definitions of all the BMPs in order to make them more understandable, specific, and enforceable by ADEQ and the Department of Agriculture. This rulemaking also separates the rules by applicable nonattainment area (Maricopa, Moderate designated after June 1, 2009, and Pinal) for clarity and to further define more specific rules for commercial farmers and commercial animal operators within the Pinal County PM nonattainment area. Lastly, this rulemaking changes the reporting mechanisms for the crop and animal programs. Reports will be kept at the farm or animal operation each year and list the BMPs that are being implemented during the current year. Additionally, in the Pinal County PM nonattainment area, an expanded 3-year report will be turned in every three years by each farmer or animal operator with more specific information about their farms or operations. This information is necessary for an approvable State Implementation Plan (SIP) pursuant to A.R.S. §§ 49-404 and 49-406.

A.R.S. § 49-457 (F) gives rulemaking authority to the Agricultural Best Management Practices Committee (AgBMP Committee) and tasks ADEQ and the Department of Agriculture to provide technical assistance to the Committee.

Background.

History and Evolution of the AgBMP Program since 2007

Senate Bill 1552

Senate Bill (SB) 1552, which was signed by Governor Napolitano on July 2, 2007, mandated enactment of a variety of programs for reduction of PM_{10} in the Maricopa County nonattainment area and the Maricopa County portion of Area A for all contributing sources, including expansion of the AgBMP program. Forty-eighth Legislature, First Regular Session, 2007, Chapter 292, § 14. Section 20 of the bill authorized the exempt rule making that was published on December 7, 2007 (13 A.A.R. 4326). The exempt rule had an immediate effective date in compliance with section 41-1032, Arizona Revised Statutes, in order to comply with the December 31, 2007, deadline imposed by the EPA for submittal of the 5% Plan. It required that emission reductions occur during the critical winter time stagnant air condition period during which PM_{10} exceedances have historically occurred. This rulemaking was exempt from Title 41, Chapter 6, Article 3, Arizona Revised Statutes, which establishes the procedures and policies for rule making within the State agencies. Senate Bill 1552 also recognized the statutory authority, A.R.S. § 49-457, of the Governor's Agriculture Best Management Practices Committee (AgBMP Committee) to develop best management practices (BMPs) and, with the assistance of ADEQ, submit rules for publication in the *Arizona Administrative Register.*

Senate Bill 1225

SB 1225, signed by Governor Brewer on July 13, 2009, expanded the applicability of agricultural best management practices (BMPs) under A.R.S. § 49-457, to include activities of dairy, beef cattle feedlot, and poultry or swine facilities (animal operations). Forty-ninth Legislature, First Regular Session, 2009, Chapter 180, Senate Bill 1225, § 2. The BMPs were added to the rules on January 20, 2012 in order to further reduce emissions of particulate matter by including practices related to unpaved access connections, roads or feed lanes; animal waste handling and transporting; and arenas, corrals and pens. 18 A.A.R. 137. As part of the January 20, 2012 rulemaking, commercial animal operators in the Maricopa County PM_{10} nonattainment area and the Maricopa County portion of Area A were required to choose two BMPs from each category and commercial animal operators in moderate nonattainment areas designated after June 1, 2009, were required to choose one BMP from each category. The EPA designated a new West Pinal PM-10 Moderate Nonattainment Area in a Notice of Final Rulemaking published May 21, 2012 (77 FR 32024), effective July 2, 2012. The current rulemaking, further define BMP requirements for the Pinal County PM nonattainment area. Those animal operators will still have to choose one BMP from each category. In addition, commercial beef cattle feedlots will add water to pen surface on the day of a forecasted high risk day, and commercial dairy operations will apply water as a dust suppressant to roads with more than 20 Vehicle Daily Trips (VDT) on the day of a forecasted high risk day. The AgBMP Committee holds statutory authority under A.R.S.

§49-457 to develop BMPs for commercial animal operations.

Senate Bill 1408

SB 1408, signed by the Governor Brewer on April 16, 2010, expanded the applicability of the BMPs under A.R.S. § 49-457, to include the activities of irrigation districts in regulated areas established after June 1, 2009, which includes the Pinal County PM nonattainment area. Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1. The current rulemaking adds BMPs to reduce particulate matter emissions from practices related to unpaved operation and maintenance roads, canals, and unpaved utility access roads. The AgBMP Committee holds statutory authority under A.R.S. §49-457 to develop BMPs for the irrigation districts.

Senate Bill 1193

SB 1193, signed by Governor Brewer on April 28, 2010, added new subsection O, which stated that the regulation of PM_{10} produced by regulated agricultural activities is a matter of statewide concern. Forty-ninth Legislature, Second Regular Session, 2010, Chapter 207, § 1. This would preclude any other county, city, town or political subdivision of this State to regulate these activities. This SB also changed the time limit for submitting a plan to the Natural Resources Conservation District (NRCD) or the department from 6 months to 60 days. These plans are only required if the director of ADEQ determines that a person engaged in a regulated activity is not in compliance with a general permit.

House Bill 2208

HB 2208, signed by Governor Brewer on April 25, 2011, added another category, Significant Agricultural Earthmoving Activities, to the crop BMPs. Fiftieth Legislature, First Regular Session, 2011, Chapter 214, § 4. These BMPs were added in the January 20, 2012 rulemaking in order to the rule to reduce particulate matter during these defined activities for Commercial farmers in Maricopa County PM_{10} nonattainment area and the Maricopa County portion of Area A and moderate nonattainment areas designated after June 1, 2009 (which included the Pinal County PM nonattainment area). 18 A.A.R. 137. Farmers in the Maricopa County serious PM_{10} nonattainment area must choose two BMPs to implement from this category. Farmers in moderate PM_{10} nonattainment areas must choose one BMP to implement from this category. In this rulemaking, farmers will need to choose only one BMP from this category for the more defined Pinal County PM_{10} nonattainment area. HB 2208 also gives the authority for the exempt rulemaking. The AgBMP Committee holds statutory authority under A.R.S. §49-457 to develop BMPs for significant agricultural earthmoving activities.

House Bill 2394

HB 2394 also amends A.R.S. § 49-457, was signed by Governor Ducey on April 9, 2015, and the statute as amended is effective from and after December 31, 2015. Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1. The bill, in preparation for the exempt rulemaking herein, removes the 18-month delay for compliance with the agricultural general permit and requires immediate compliance with the permit. The bill also made a technical change.

Phoenix Planning area

Portions of Maricopa County were designated nonattainment for PM_{10} on November 15, 1990, under section 107(d)(4)(B) of the amended Clean Air Act (CAA). The boundaries of the nonattainment area are listed in 40 CFR § 81.303. The CAA requires state and local authorities to implement stricter particulate matter pollution controls in PM_{10} nonattainment areas. To that end, ADEQ and the Maricopa Association of Governments (MAG), acting under delegated authority, developed a state implementation plan for the area. The original plan and subsequent revisions failed to bring the area into attainment.

On June 6, 2007, at 72 FR 31183, the Environmental Protection Agency made a finding that the Phoenix Planning Area had not attained the National Ambient Air Quality Standard (NAAQS) for PM_{10} by the December 31, 2006, deadline mandated pursuant to the CAA. EPA based its Finding on monitored air quality data from 2004 through 2006.

ADEQ was required to submit by December 31, 2007, a five percent annual Reasonable Further Progress plan (5% Plan) that provides for attainment of the PM_{10} standard as required by CAA Section 189(d). The Maricopa Association of Governments (MAG) was been certified under A.A.C. 49-406 as the agency responsible for the development of the 5% Plan. The plan demonstrated three years of 5% annual reductions, which is expected to be sufficient for attainment. ADEQ submitted R18-2-610 and R18-2-611 as the agricultural community's contribution to the 5% Plan, as one of the Plan's contingency measures. On June 12, 2009, ADEQ submitted a negative declaration adopted by the Pinal County Board of Supervisors affirming that agricultural practices are not present in the Township 1 North, Range 8 East portion of this nonattainment area included within Pinal County.

On September 9, 2010, at 75 FR 54806, the Environmental Protection Agency (EPA) published a proposed rule

to approve in part and disapprove in part, the 5% Plan. EPA found, among other things, that the contingency measures did not meet the requirements of Clean Air Act (CAA) section 189(c). EPA proposed a limited approval and disapproval of R18-2-610 and R18-2-611 as submitted. EPA argued that the regulations strengthened the 5% Plan, but do not fully meet the requirements of CAA sections 100(a) and 189(b)(1)(B) for enforceable Best Available Control Measures (BACM) for agricultural sources of PM_{10} in the Maricopa Area.

On January 25, 2011, ADEQ withdrew the 5% Plan from EPA's consideration. All air quality rules and statues contained in the Plan remain in effect. MAG, ADEQ, and Maricopa County Air Quality Department (MCAQD) worked on the Plan in a cooperative and collaborative effort with the EPA, and submitted the plan on May 25, 2012. The AgBMP program, however, was not included as a control or contingency measure in the newly submitted 5% Plan. The EPA proposed approval of the Plan on February 6, 2014 at 79 FR 7118, and finalized approval of the 5% Plan on June 10, 2014 at 79 FR 33107. A maintenance plan is required to be submitted and approved by EPA before the area can be re-designated to attainment status.

Pinal County PM Nonattainment Area

The Pinal County PM Nonattainment Area includes both the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area; the boundaries of the nonattainment areas are listed in 40 CFR § 81.303. On May 31, 2012, the EPA re-designate the area of Western Pinal County from "unclassifiable" to "nonattainment" for the 1987 National Ambient Air Quality Standards (NAAQS) for PM_{10}; the redesignation was effective on July 2, 2012. On February 3, 2011, the EPA re-designated the West Central Pinal $PM_{2.5}$ planning area to nonattainment for the 2006 NAAQS for $PM_{2.5}$, after waiting to collect more monitoring data. 76 FR 6056. On September 3, 2013, the EPA determined that the West Central Pinal $PM_{2.5}$ Nonattainment Area had attained those standards based on three years of monitoring data (clean data finding) and suspended several otherwise applicable requirements for nonattainment area plans. 78 FR 54394. Both a nonattainment plan and a maintenance plan are required to be submitted and approved by EPA before the area can be re-designated to attainment status.

New Sections added specifically to address the Pinal County PM nonattainment area are:

1) 610.03. Agricultural PM General Permit for Commercial Farms; Pinal County PM Nonattainment Area,
2) 611.03 Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area,
3) R18-2-612. Definitions for R18-2-612.01, and
4) R18-2-612.01.Agricultural PM General Permit For Irrigation Districts; Moderate PM Nonattainment Areas Designated After June 1, 2009.

These sections contain identifiable control measures for the Pinal County PM nonattainment area and will be submitted to the EPA as a revision to the Arizona State Implementation Plan (SIP) along with any other Reasonably Available Control Measures (RACM) implemented to control PM emissions from identified significant sources in the area.

Section by Section Explanation of the Rules

R18-2-210. Attainment, Nonattainment, and Unclassifiable Area Designations

The rulemaking updates Arizona's incorporated by reference designation status in 40 CFR 81.303 as of July 1, 2014.

R18-2-610. Definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03

The rulemaking makes changes to many of the definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03 to provide additional clarity, specificity, and enforceability.

R18-2-610.01. Agricultural PM General Permit for Commercial Farms; Maricopa County PM Nonattainment Area

The rulemaking changes this rule to only for the Maricopa County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-610.02. Agricultural PM General Permit for Commercial Farms; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area

The rulemaking adds a new section that applies only to commercial farmers implementing AgBMPs in Moderate PM Nonattainment Areas Designated After June 1, 2009 (not including the Pinal County PM nonattainment area) and makes changes recordkeeping requirements specific to these areas.

R18-2-610.03. Agricultural PM General Permit for Commercial Farms; Pinal County PM Nonattainment Area

The rulemaking adds a new section that applies only to commercial farmers implementing AgBMPs in the Pinal

County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-611. Definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03
The rulemaking makes changes to many of the definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03 to provide additional clarity, specificity, and enforceability.

R18-2-611.01. Agricultural PM General Permit for Animal Operations; Maricopa County PM Nonattainment Areas
The rulemaking changes this rule to apply only to commercial animal operators implementing BMPs in the Maricopa County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-611.02. Agricultural PM General Permit for Animal Operations; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area
The rulemaking changes this rule to apply only to commercial animal operators implementing BMPs Moderate PM Nonattainment Areas Designated After June 1, 2009 (not including the Pinal County PM nonattainment area) and makes changes recordkeeping requirements specific to these areas.

R18-2-611.03. Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area
The rulemaking changes this rule to apply only to commercial animal operators implementing BMPs in the Pinal County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-612. Definitions for R18-2-612.01
This rulemaking repealed the Definitions for the Yuma AgBMP rule from R18-2-612, and added a new section R18-2-612 for Definitions for R18-2-612.01.

R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; Moderate PM Nonattainment Areas Designated After June 1, 2009
This rulemaking added a new section R18-2-612.01 for the implementation of BMPs for Irrigation Districts located in moderate nonattainment areas designated after June 1, 2009 (which includes the Pinal County nonattainment area).

R18-2-613. Definitions for R18-2-613.01
This rulemaking repealed the Yuma AgBMP rule at R18-2-613, and added a new section R18-2-613 for Definitions for the Yuma AgBMP rule. No changes were made to the rule text.

R18-2-613.01. Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices
This rulemaking adds a new Section for the Yuma AgBMP rule, which was repealed from R18-2-613. No changes were made to the rule text.

Appendix 2. Test Methods and Protocols
This rulemaking incorporates by reference the Silt Content Test Method to Appendix 2. This test method is used in the Phoenix Planning Area for PM_{10}.

7. **A reference to any study relevant to the rule that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**
   None

8. **A showing of good cause why the rule is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:**
   The rule does not diminish a previous grant of authority of a political subdivision of this state.

9. **The summary of the economic, small business, and consumer impact, if applicable:**
   Not applicable to this exempt rule.

10. **A description of any changes between the proposed rulemaking, including any supplemental proposed rulemaking, and the final rulemaking package (if applicable):**
    Not applicable

11. **An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments, if applicable:**
    Not applicable

12. Any other matters as prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules. When applicable, matters shall include, but not be limited to:

a. Whether the rule requires a permit, whether the general permit is used and if not, the reasons why a general permit is not used:

A general permit is used as described in A.R.S. § 49-457 (H).

b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than the federal law and if so, citation to the statutory authority to exceed the requirements of federal law:

Not applicable

c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:

No such analysis was submitted.

13. A list of any incorporated by reference material and its location in the rule:

Incorporation	Location in the rule
40 CFR 81.303 (As of July 1, 2014)	R18-2-210
NRCS Practice Code 609, Surface Roughening, amended through November 2008.	R18-2-610(53)
NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011.	R18-2-610(14), (15), (36), (47)
NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998.	R18-2-610(39), (56), R18-2-610.01(E)(1) and (E)(2), R18-2-610.02(E)(1) and (E)(2), R18-2-610.02(B)(6)(a) and (B)(6)(b)
NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009	R18-2-610(65), R18-2-611(2)(x), (3)(r), and R18-2-612(33)
Silt Content Test Method	Appendix 2, Subsection (N), incorporated into R18-2-610 (51)

14. Whether the rule was previously made, amended, repealed, or renumbered as an emergency rule. If so, the agency shall state where the text changed between the emergency and exempt rulemaking packages:

Not applicable

15. The full text of the rule follows:

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY AIR POLLUTION CONTROL

ARTICLE 2. AMBIENT AIR QUALITY STANDARDS; AREA DESIGNATIONS; CLASSIFICATIONS

Section
R18-2-210. Attainment, Nonattainment, and Unclassifiable Area Designations

ARTICLE 6. EMISSIONS FROM EXISTING AND NEW NONPOINT SOURCES

Section
R18-2-610. Definitions for ~~R18-2-611~~ R18-2-610.01, R18-2-610.02, and R18-2-610.03
R18-2-610.01. Agricultural PM_{10} General Permit for ~~Crop Operations~~ Commercial Farms; Maricopa County PM_{10} Nonattainment ~~Areas~~ Area
R18-2-610.02. Agricultural PM General Permit for Commercial Farms; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area
R18-2-610.03. Agricultural PM General Permit for Commercial Farms; Pinal County PM Nonattainment Area
R18-2-611. Definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03
R18-2-611.01. Agricultural ~~Animal Operations~~ PM_{10} General Permit for Animal Operations; ~~Moderate and Serious~~ Maricopa County PM_{10} Nonattainment Areas ~~Except Yuma County~~
R18-2-611.02. Agricultural PM General Permit for Animal Operations; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area
R18-2-611.03. Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area
R18-2-612. Definitions for ~~R18-2-613~~ R18-2-612.01

R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; Moderate PM Nonattainment Areas Designated After June 1, 2009, Including Pinal County PM Nonattainment Area
R18-2-613. ~~Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices~~ Definitions for R18-2-613.01
R18-2-613.01. Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices
Appendix 2. Test Methods and Protocols

ARTICLE 2. AMBIENT AIR QUALITY STANDARDS; AREA DESIGNATIONS; CLASSIFICATIONS

R18-2-210. Attainment, Nonattainment, and Unclassifiable Area Designations
40 CFR 81.303 as amended as of July 1, ~~2011~~ 2014 (and no future amendments or editions) is incorporated by reference as an applicable requirement and on file with the Department of Environmental Quality. 40 CFR 81.303 is available from the U.S. Government Printing Office, Superintendent of Documents, bookstore.gpo.gov, Mail Stop: SSOP IDCC-SSOM, Washington, D.C. 20402-9328.

ARTICLE 6. EMISSIONS FROM EXISTING AND NEW NONPOINT SOURCES

R18-2-610. Definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03
The definitions in R18-2-101 and the following definitions apply to R18-2-610.01, R18-2-610.02, and R18-2-610.03:

1. "Access restriction" means reducing PM emissions by reducing the number of trips driven on agricultural aprons and access roads by restricting or eliminating public access to noncropland or commercial farm roads with signs or physical obstruction at locations that effectively control access to the area.
2. "Aggregate cover" means reducing PM emissions and wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to noncropland or commercial farm roads ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a depth sufficient to reduce PM emissions.
3. "Area A" means the area delineated according to A.R.S. § 49-541(1).
4. "Best management practice" (BMP) means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.
5. "Cessation of Night Tilling" means the discontinuation of ~~night~~ tillage ~~tilling~~ from sunset to sunrise on a day identified by the Maricopa or Pinal County Dust Control Forecast as being high risk of dust generation.
6. "Chemical irrigation" means reducing a minimum of one ground operation ~~reducing the number of passes~~ across a commercial farm by applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system, which reduces soil disturbance and increases efficiency of application.
7. "Chips/ mulches" means reducing PM emissions and soil movement and preserving soil moisture by applying and maintaining nontoxic chemical or organic dust suppressants to a depth sufficient to reduce PM emissions. Materials shall meet all specifications required by federal, state, or local water agencies, and is not prohibited for use by any applicable regulations.

~~7~~8. "Combining tractor operations" means reducing soil compaction and ~~the number of passes~~ a minimum of one tillage or ground operation across a commercial farm by using a tractor, implement, harvester, or other farming support vehicle to perform two or more tillage, cultivation, planting, or harvesting operations at the same time. If Equipment modification is also chosen as a BMP, and uses the same practices as described in this BMP, this action is considered one BMP.

~~8~~9. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.

10. "Commercial farm road" means a road that is unpaved, owned by a commercial farmer, and is used exclusively to service a commercial farm.

~~9~~11. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.

~~10~~12. "Committee" means the Governor's Agricultural Best Management Practices Committee as established by A.R.S. § 49-457.

13. "Conservation Tillage" means a tillage system that reduces a minimum of three tillage operations. This system reduces soil and water loss by planting into existing plant stubble on the field after harvest as well as managing the stubble so that it remains intact during the planting season.

~~11~~14. "Cover crop" means establishing cover crops that maintain a minimum of 60 percent ground cover. Native or volunteer vegetation that meets the minimum ground cover requirement is acceptable. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions). ~~reducing wind erosion and PM_{10} emissions by using plants or a green manure crop seasonally to protect soil surfaces between crops and control soil movement.~~

~~12~~15. "Critical area planting" means reducing PM_{10} emissions and wind erosion by planting trees, shrubs, vines, grasses, or other vegetative cover on noncropland in order to maintain at least 60 percent ~~adequate~~ ground cover. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions).

~~13~~16."Cropland" means land on a commercial farm that:

a. Is within the time-frame of final harvest to plant emergence, but does not include tillage activities;
b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
c. Is a turn-row.

~~14~~17."Cross-wind ridges" means stabilizing soil and reducing PM_{10} emissions and wind erosion by creating soil ridges in a commercial farm by tillage or planting operations. Ridges should be at least four inches in height, and be aligned as perpendicular as possible to the prevailing wind direction. ~~Soil should be stable enough to sustain effective ridges.~~

~~15. "Cross-wind strip-cropping" means stabilizing soil and reducing PM_{10} emissions by growing strips of at least two crops: herbaceous cover or managing crop or herbaceous residue as a protective cover within the same field. Strips should be aligned as perpendicular as possible to the prevailing wind directions.~~

18. "Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following:
    a. Projected meteorological conditions, including:
        i. Wind speed and direction,
        ii. Stagnation,
        iii. Recent precipitation, and
        iv. Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

~~16~~19. "Equipment modification" means reducing PM_{10} emissions and soil erosion during tillage ~~and~~ or ~~harvest~~ ground operations by modifying and maintaining an existing piece of agricultural equipment, ~~purchasing new equipment, increasing equipment size~~, installing shielding equipment, modifying land planting and land leveling, matching the equipment to row spacing, or grafting to new varieties or technological improvements. If combining tractor operations is also chosen as a BMP, and uses the same practices as described in this BMP, this action is considered one BMP.

~~17~~20."Fallow Field" means an area of land that is routinely cultivated, planted and harvested and is unplanted for one or more growing seasons or planting cycles, but is intended to be placed back in agricultural production.

21. "Field Capacity" means the amount of water remaining in the soil two days after having been saturated and after free drainage has ceased.

~~18~~22."Forage Crop" means a product grown for consumption by any domestic animal.

~~19~~23."Genetically Modified" (GMO) means a living organism whose genetic material has been altered, changing one or more of its characteristics.

~~20. "GMO: Genetically Modified Organism" means a plant that has been altered by a genetic exchange with another organism.~~

~~21~~24."GPS: Global Position Satellite System" means using a satellite navigation system on farm equipment to calculate position in the field.

~~22~~25. "Green ~~Chop~~ chop" means reducing soil compaction, soil disturbance and ~~the number of passes~~ a minimum of one ground operation across a commercial farm by harvesting ~~of~~ a Forage Crop without allowing it to dry in the field.

26. "Ground operation" means an agricultural operation that is not a tillage operation, which involves equipment passing across the field. A ground operation includes harvest activities. A pass through the field may be a subset of a ground operation.

27. "Harvest" means the time after planting up through harvest, including gathering mature crops from a commercial farm, as well as all actions taken immediately after crop removal, such as cooling, sorting, cleaning, and packing.

~~23~~28."Integrated Pest Management" means reducing soil compaction and ~~the number of passes in~~ a minimum of one ground operation across a commercial farm for spraying by using a combination of techniques including organic, conventional, and biological farming practices to suppress pest problems.

~~24~~29. ~~"~~Limited harvest activity ~~during a high-wind event"~~ means performing no ~~harvest or soil preparation activity~~ ground operations on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation. ~~when the measured wind speed as measured by a hand held anemometer is more than 25 miles per hour at the commercial farm site.~~

~~25~~30."Limited tillage activity ~~during a high-wind event~~" means performing no tillage operations ~~or soil preparation activity~~ on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation. ~~when the measured wind speed as measured by a hand held anemometer is more than 25 miles per hour at the commercial farm site.~~

~~26~~31."Maricopa PM_{10} nonattainment area" means the Phoenix planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.

~~27. "Mulching" means reducing PM_{10} emissions and wind erosion and preserving soil moisture by applying a protective layer of plant residue or other material that is not produced onsite to a soil surface to reduce soil movement.~~

~~28~~32."Multi-year crop" means reducing PM_{10} emissions from wind erosion ~~or~~ and a minimum of one tillage and ground operation across a commercial farm, by protecting the soil surface by growing a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.

~~29~~33."Noncropland" means any commercial farm land that:

a. Is no longer used for agricultural production;
b. Is no longer suitable for production of crops;
c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or
d. Includes a ~~private farm road,~~ ditch, ditch bank, equipment yard, storage yard, or well head.

34. "NRCS" means the Natural Resource Conservation Service.

~~30. "Night Tilling" means preparing the land for the raising of crops between the hours of 2:00 a.m. and 8:00 a.m.~~

~~31. "Organic farming practices" means using biological or non-chemical agricultural methods.~~

~~32. "Organic material application" means applying animal waste or biosolids to a soil surface.~~

35. "Organic material cover" means reducing PM emissions and wind erosion and preserving soil moisture by applying and maintaining cover material such as animal waste or plant residue, to a soil surface to reduce soil movement. Material shall be evenly applied and maintained to a depth sufficient to reduce PM emissions and coverage should be a minimum of 70 percent.

~~33~~36."Permanent cover" means reducing PM_{10} emissions and wind erosion by maintaining a long-term perennial vegetative cover on cropland that is temporarily not producing a major crop. Perennial species such as grasses and/or legumes shall be used to establish at least 60 percent cover. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions).

37. "Pinal County PM Nonattainment Area" means the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area, as defined in 40 CFR 81.303, and incorporated by reference in R18-2-210.

38. "Plant stubble" means stubble on the soil surface, which insulates soil to reduce evaporation of moisture, and also protects the soil from wind and water erosion.

~~34~~39."Planting based on soil moisture" means reducing PM emissions and wind erosion by applying water or having enough moisture in the soil to germinate the seed prior to planting. Soil must have a minimum soil moisture content of 60% of field capacity at planting depth. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions).

40. "PM" includes both particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53; and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 CFR 50 Appendix J or by an equivalent method designated in accordance with 40 CFR 53, as incorporated by reference in Appendix 2.

~~35~~41."Precision Farming" means reducing ~~the number of passes~~ the number of passes across a commercial farm by at least 12 inches per pass by using GPS to precisely guide farm equipment in the field.

~~36~~42."Reduce vehicle speed" means reducing PM_{10} emissions and soil erosion from the operation of farm vehicles or farm equipment on noncropland or commercial farm roads at speeds not to exceed ~~20~~ 15. This can be achieved through installation of engine speed governors, signage, or speed control devices.

~~37~~43. "Reduced harvest activity" means reducing soil disturbance, soil and water loss, and the number of mechanical harvest passes by a minimum of one ground operation across a commercial farm, by means other than equipment modification or combining tractor operations.

~~38~~44."Reduced tillage system" means reducing soil disturbance, soil and water loss, ~~the number of~~ by using a single piece of equipment that reduces a minimum of three tillage operations, by means other than equipment modification or combining tractor operations.

~~39~~45."Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(1)(a) through (P)(1)(d)~~(5)~~.

~~40~~46."Regulated area" means ~~a~~ the regulated area as defined in A.R.S. § 49-457(P)(6).

~~41~~47."Residue management" means reducing PM_{10} emissions and wind erosion by ~~managing the amount and distribution~~ maintaining a minimum of 60 percent ground cover of crop and other plant residues on a soil surface between the time of harvest of one crop and the ~~emergence of a~~ commencement of tillage for a new crop. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions).

~~42~~48."Sequential cropping" means reducing PM_{10} emissions and wind erosion by growing crops in a sequence or close rotation that limits the amount of time bare soil is exposed on a commercial farm to 30 days or less.

~~43~~49."Shuttle System/Larger Carrier" means reducing ~~the~~ one out of every four ~~number of~~ trips ~~passes~~ across a commercial farm by using multiple or larger bins/trailers ~~per trip~~ to haul commodity from the field.

~~44~~50."Significant Agricultural Earth Moving Activities" means either leveling activities conducted on a commercial farm that disturb the soil more than 4 inches below the surface, or the creation, maintenance and relocation of: ditches, canals, ponds, irrigation lines, tailwater recovery systems (agricultural sumps) and other water conveyances, not to include activities performed on cropland for tillage, ground operations ~~crop preparation, cultivation~~ or harvest.

51. "Silt content test method" means the test method as described in Appendix 2.

~~45~~52."Stabilization of soil prior to plant emergence" means reducing PM_{10} emissions by applying water to soil ~~in between planting and~~ prior to crop emergence in order to cause the soil to form a visible crust.

~~46~~53."Surface roughening" means reducing PM_{10} emissions ~~and~~ or wind erosion by manipulating a soil surface by means such as rough discing or tillage in order to produce or maintain clods on the land surface. Compliance shall be determined by NRCS Practice Code 609, Surface Roughening, amended through November 2008 (and no future editions).

~~47. "Stagnant Air Conditions" means a meteorological regime where warm air aloft overlies cooler air near the surface and little if any vertical mixing occurs.~~

~~48~~54."Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on noncropland or commercial farm roads with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~49. "Tillage and harvest" means any mechanical practice that physically disturbs cropland or crops on a commercial farm.~~

55. "Tillage" means any mechanical practice that physically disturbs the soil, and includes preparation for planting, such as plowing, ripping, or discing.

~~50~~56."Tillage based on soil moisture" means reducing PM_{10} emissions by irrigating fields to the depth of the proposed cut prior to soil disturbances or conducting tillage to coincide with precipitation. Soil must have a minimum soil moisture content of 40-60% of field capacity at planting depth. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions).

~~51~~57."Timing of a tillage operation" means reducing wind erosion and PM emissions by performing tillage operations that minimize the amount of time within 45 days. ~~the soil surface is susceptible to wind erosion resulting in PM_{10}~~.

58. "Tillage operation" means an agricultural operation that mechanically manipulates the soil for the enhancement of crop production. Examples include discing or bedding. A pass through the field may be a subset of a tillage operation.

~~52~~59."Track-out control system" means ~~reducing PM_{10} emissions~~ minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from noncropland or commercial farm roads or and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.

~~53~~60."Transgenic Crops" means reducing ~~the need~~ a minimum of one ~~for~~ tillage or ~~cultivation~~ ground operations, the number of chemical spray applications, or soil disturbances by using plants that are genetically modified.

~~54~~61."Transplanting" means reducing ~~the number of passes in~~ a minimum of one ground operation across a commercial farm and minimizing soil disturbance by utilizing plants already in a growth state as compared to seeding.

62. "VDT" (Vehicle trips per day) means trips per day made by one vehicle, in one direction.

~~55~~63."Watering" means reducing PM_{10} emissions and wind erosion by applying water to noncropland or commercial farm road bare soil surfaces during periods of high traffic until the surfaces are visibly moist.

64. "Watering on a high risk day" means reducing PM emissions and wind erosion by applying water to commercial farm road bare soil surfaces until the surfaces are visibly moist, on a day forecast to be high risk for dust generation by the Maricopa or Pinal County Dust Control Forecast.

~~56~~65."Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

~~**R18-2-610.01. Agricultural PM_{10} General Permit for Crop Operations; Maricopa County PM_{10} Nonattainment Areas**~~

~~A. A commercial farmer shall comply with this Section by January 1, 2012. Until the end of the transition period on March 31, 2013, a commercial farmer shall maintain a record demonstrating compliance with this Section. The record shall be provided to the Director within two business days of notice to the commercial farmer. The record shall contain:~~

~~1. The name of the commercial farmer;~~

~~2. The mailing address or physical address of the commercial farm; and~~

~~3. The best management practices selected for tillage and harvest, noncropland, and cropland.~~

~~B. A commercial farmer, who begins a regulated agricultural activity after January 1, 2012, shall comply with this Section within three months of beginning the regulated agricultural activity.~~

~~C~~A. A commercial farmer within the Maricopa County ~~a Serious~~ PM_{10} Nonattainment Area shall implement at least two best management practices from each category to reduce PM_{10} emissions.

~~D. A commercial farmer within a Moderate PM_{10} Nonattainment Area shall implement at least one best management practice from each category to reduce PM_{10} emissions.~~

~~E~~B. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM emissions during ~~harvest and~~ tillage, harvest or ground operation activities:

1. Chemical irrigation,
2. Combining tractor operations,
3. Equipment modification,
4. Green Chop,
5. Integrated Pest Management,
6. Limited harvest activity ~~during a high-wind event~~,
7. Limited tillage activity ~~during a high-wind event~~,
8. Multi-year crop,
9. Cessation of Night Tilling,
10. Planting based on soil moisture,
11. Precision Farming,
12. Reduced harvest activity,
13. Reduced tillage system,
14. Tillage based on soil moisture,
15. Timing of a tillage operation,
16. Transgenic Crops,
17. Transplanting, ~~or~~
18. Shuttle System/Larger Carrier, or
19. Conservation Tillage.

~~F~~C. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM_{10} emissions from noncropland and commercial farm roads:

1. Access restriction,
2. Aggregate cover,
3. Wind barrier,
4. Critical area planting,
5. Organic material ~~application~~ cover,
6. Reduce vehicle speed,
7. Synthetic particulate suppressant,
8. Track-out control system, or
9. Watering.

~~G~~D. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM_{10} emissions from cropland:

1. Wind barrier,
2. Cover crop,
3. Cross-wind ridges,
4. ~~Cross-wind strip-cropping,~~
5. ~~Integrated Pest Management,~~
6. ~~Organic material application~~ Chips/mulches,
7. ~~Mulching,~~
8. Multi-year crop,
9. Permanent cover,
10. Stabilization of soil prior to plant emergence,
11. ~~Precision Farming,~~
12. Residue management,
13. Sequential cropping, or
14. Surface roughening.

~~H~~E. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM emissions when conducting Significant Agricultural Earth Moving Activities as defined in R18-2-610:

1. Apply water prior to conducting Significant Agricultural Earth Moving Activities and/or time Significant Agricultural Earth Moving Activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);

2. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
3. Limit activities ~~during high wind events~~ on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation; or
4. Conduct Significant Agricultural Earth Moving Activities in a manner to ~~minimize the number of passes~~ reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.~~; or~~
5. ~~Conduct Significant Agricultural Earth Moving Activities as close to possible to planting or otherwise stabilize the soil, except for emergency maintenance purposes~~

~~I. Beginning March 31, 2013, or within 90 days after the start of a new regulated agricultural activity, whichever is later, the commercial farmer shall complete and submit a Best Management Practices Program General Permit Record Form to the Arizona Department of Agriculture. Thereafter, the commercial farmer shall also complete and submit a Best Management Practices Program General Permit Record Form to the Arizona Department of Agriculture on March 31 of each calendar year. The Best Management Practice Program General Permit Record form shall include the following information:~~

1. ~~At least the required number of best management practices as described in subsection (C) or (D) that the commercial farmer implemented during the previous calendar year;~~
2. ~~At least the required number of best management practices as described in subsection (C) or (D) that the commercial farmer intends to implement during the current calendar year;~~
3. ~~The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices;~~
4. ~~The signature of the commercial farmer and the date the form was signed.~~

F. From and after December 31, 2015, a commercial farmer who engages in a regulated agricultural activity shall complete and maintain a Best Management Practices Program General Permit Record Form demonstrating compliance with this Section. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial farmer. The Best Management Practice Program General Permit Record Form shall include the following information:

1. The name of the commercial farmer, signature, and date signed;
2. The mailing address or physical address of the commercial farm; and
3. The best management practices selected for tillage, harvest, and ground operation activities, cropland, noncropland and commercial farm roads, and significant earth moving activities (if applicable).

~~J. Beginning in Calendar Year 2014, and no more than once every subsequent three calendar years, the Director shall provide the commercial farmer with a Best Management Practices Program Periodic Survey. The commercial farmer may complete and submit the survey to the Arizona Department of Agriculture. The Periodic Survey shall include the following information:~~

1. ~~The type and acreage of each crop type planted during the calendar year that the survey is conducted;~~
2. ~~The total miles of unpaved roads at the commercial farm, and~~
3. ~~The total acreage of the unpaved equipment and traffic areas at the commercial farm.~~

~~K~~G. Records of any changes to the Best Management Practices identified in the most recently submitted Best Management Practices Program General Permit Record Form shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.

~~L~~H. A person may develop ~~petition the Committee to consider~~ different practices to control PM_{10} emissions not contained in ~~either of the categories of subsection~~ subsections (B), (C), (D), or (E) ~~(E), (F), (G), or (H). The Committee may require~~ and may submit such practices that are proven effective through on-farm demonstration trials to ~~be conducted under the conditions established by~~ the Committee. The proposed new practices shall not become effective unless submitted ~~approved by the Committee~~ as described in A.R.S. § 49-457(L).

~~M~~I. A commercial farmer shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

~~N~~J. The Director shall not assess a fee to a commercial farmer for coverage under the agricultural PM_{10} general permit.

~~O~~K. A commercial farmer shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

~~P~~L. The Director shall document noncompliance with this Section before issuing a compliance order.

~~Q~~M. A commercial farmer who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-610.02. Agricultural PM General Permit for Crop Operations; Moderate PM Nonattainment Areas, Designated After June 1, 2009

A. A commercial farmer within a PM Moderate Nonattainment Area, designated after June 1, 2009, shall implement at least one best management practice from each category to reduce PM emissions.

B. A commercial farmer shall implement from the following best management practices, as described in subsection (A), to reduce PM emissions during tillage, harvest and ground operation activities:

1. Chemical irrigation.

2. Combining tractor operations,
3. Equipment modification,
4. Green Chop,
5. Integrated Pest Management,
6. Limited harvest activity,
7. Limited tillage activity,
8. Multi-year crop,
9. Cessation of Night Tilling,
10. Planting based on soil moisture,
11. Precision Farming,
12. Reduced harvest activity,
13. Reduced tillage system,
14. Tillage based on soil moisture,
15. Timing of a tillage operation,
16. Transgenic Crops,
17. Transplanting, or
18. Shuttle System/Larger Carrier, or
19. Conservation Tillage.

C. A commercial farmer shall implement from the following best management practices, as described in subsection (A), to reduce PM emissions from noncropland and commercial farm roads:
1. Access restriction,
2. Aggregate cover,
3. Wind barrier,
4. Critical area planting,
5. Organic material cover,
6. Reduce vehicle speed,
7. Synthetic particulate suppressant,
8. Track-out control system, or
9. Watering.

D. A commercial farmer shall implement from the following best management practices, as described in subsection (A), to reduce PM emissions from cropland:
1. Wind barrier,
2. Cover crop,
3. Cross-wind ridges,
4. Chips/mulches,
5. Multi-year crop,
6. Permanent cover,
7. Stabilization of soil prior to plant emergence,
8. Residue management,
9. Sequential cropping, or
10. Surface roughening.

E. A commercial farmer shall implement from the following best management practices, as described in subsection (A), when conducting Significant Agricultural Earth Moving Activities as defined in R18-2-610:
1. Apply water prior to conducting Significant Agricultural Earth Moving Activities and/or time Significant Agricultural Earth Moving Activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
2. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
3. Limit activities on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation; or
4. Conduct Significant Agricultural Earth Moving Activities in a manner to reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.

F. From and after December 31, 2015, a commercial farmer who engages in a regulated agricultural activity shall complete and maintain a Best Management Practices Program General Permit Record Form demonstrating compliance with this Section. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial farmer. The Best Management Practice Program General Permit Record Form shall include the following information:
1. The name of the commercial farmer, signature, and date signed;
2. The mailing address or physical address of the commercial farm; and

3. The best management practice selected for tillage, harvest and ground operation activities, cropland, noncropland and commercial farm roads, and significant earth moving activities (if applicable).

G. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.

H. A person may develop different practices to control PM emissions not contained in subsections (B), (C), (D), or (E) and may submit such practices that are proven effective through on-farm demonstration trials to the Committee. The proposed new practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

I. A commercial farmer shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

J. The Director shall not assess a fee to a commercial farmer for coverage under the agricultural PM general permit.

K. A commercial farmer shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

L. The Director shall document noncompliance with this Section before issuing a compliance order.

M. ~~A commercial farmer who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).~~

R18-2-610.03. Agricultural PM General Permit for Crop Operations; Pinal County PM Nonattainment Area

A. On the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of best management practices as described in sections (B)(1)(b), (B)(2)(b), (B)(3)(b), (B)(4)(b), and (B)(5)(b).

B. On all days, a commercial farmer shall implement at least one best management practice from each category to reduce PM emissions, as described below in subsections (1)(a), (2)(a), (3)(a), (4)(a), and (6), and at least two best management practices from subsection (5)(a). If a commercial farmer implements the Conservation tillage or Reduced tillage system best management practice for the tillage category, they do not have to implement a best management practice from the subsections (2)(a), (2)(b), (5)(a) and (5)(b).

1. Tillage:
   a. A commercial farmer shall implement at least one of the following:
      i. Combining tractor operations,
      ii. Equipment modification,
      iii. Multi-year crop,
      iv. Cessation of night tilling,
      v. Planting based on soil moisture,
      vi. Precision farming,
      vii. Tillage based on soil moisture,
      viii. Timing of a tillage operation,
      ix. Transgenic crops,
      x. Transplanting,
      xi. Reduced tillage system, or
      xii. Conservation tillage.
   b. Unless choosing limited tillage activity (subsection iv, below), on the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of at least one of the following:
      i. Multi-year crop,
      ii. Planting based on soil moisture,
      iii. Tillage based on soil moisture,
      iv. Limited tillage activity,
      v. Reduced tillage system, or
      vi. Conservation tillage.
2. Ground Operations and Harvest:
   a. A commercial farmer shall implement at least one of the following:
      i. Combining tractor operations,
      ii. Equipment modification,
      iii. Chemical irrigation,
      iv. Green chop,
      v. Integrated pest management,
      vi. Multi-year crop,
      vii. Precision farming,
      viii. Reduced harvest activity,
      ix. Transgenic crops, or
      x. Shuttle System/Larger Carrier.

b. Unless choosing limited harvest activity (subsection iv, below), on the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of at least one of the following:
   i. Green chop,
   ii. Integrated pest management,
   iii. Multi-year crop, or
   iv. Limited harvest activity.

3. Noncropland:
   a. A commercial farmer shall implement at least one of the following best management practices:
      i. Access restriction,
      ii. Aggregate cover,
      iii. Wind barrier,
      iv. Critical area planting,
      v. Organic material cover,
      vi. Reduce vehicle speed,
      vii. Synthetic particulate suppressant, or
      viii. Watering.
   b. Unless choosing watering on a high risk day (subsection vi, below), on the day before and during a day forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a on a noncropland area that experiences more than 20 VDT from 2 or more axle vehicles, commercial farmer shall ensure implementation of at least one of the following best management practices:
      i. Aggregate cover,
      ii. Wind barrier,
      iii. Critical area planting,
      iv. Organic material cover,
      v. Synthetic particulate suppressant, or
      vi. Watering on a high risk day.
4. Commercial farm roads:
   a. A commercial farmer shall implement at least one of the following best management practices:
      i. Access restriction,
      ii. Reduce vehicle speed,
      iii. Track-out control system,
      iv. Aggregate cover,
      v. Synthetic particulate suppressant,
      vi. Watering, or,
      vii. Organic material cover.
   b. Unless choosing watering on a high risk day (subsection vi, below), on the day before and during a day forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, on a road that experiences more than 20 VDT from 2 or more axle vehicles, a commercial farmer shall ensure implementation of at least one of the following best management practices:
      i. Aggregate cover,
      ii. Synthetic particulate suppressant,
      iii. Wind barrier,
      iv. Organic material cover,
      v. Roads are stabilized as determined by the silt content test method,
      vi. Watering on a high risk day.
5. Cropland:
   a. A commercial farmer shall implement at least two of the following best management practices, one from subsection (i) through (vii), and one from subsection (viii) through (xi), to reduce PM emissions from cropland:
      i. Wind barrier,
      ii. Cover crop,
      iii. Cross-wind ridges,
      iv. Chips/mulches,
      v. Sequential cropping
      vi. Residue management,
      vii. Surface roughening,
      viii. Multi-year crop,
      ix. Permanent cover, or
      x. Stabilization of soil prior to plant emergence.

b. On the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of at least one of the following:
   i. Wind barrier,
   ii. Cover crop,
   iii. Cross-wind ridges,
   iv. Chips/mulches,
   v. Surface roughening,
   vi. Multi-year crop,
   vii. Permanent cover,
   viii. Stabilization of soil prior to plant emergence, or
   ix. Residue management.

6. A commercial farmer shall implement at least one of the following best management practices, when conducting Significant Agricultural Earth Moving Activities as defined in R18-2-610:
   a. Apply water prior to conducting Significant Agricultural Earth Moving Activities and/or time Significant Agricultural Earth Moving Activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
   b. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
   c. Limit activities on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation; or
   d. Conduct Significant Agricultural Earth Moving Activities in a manner to reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.

C. From and after December 31, 2015, a commercial farmer who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form demonstrating compliance with this rule. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial farmer. The Best Management Practice Program General Permit Record Form shall include the following information:
   1. The name of the commercial farmer, signature, and date signed;
   2. The mailing address or physical address of the commercial farm; and
   3. The best management practices selected for tillage, ground operations and harvest, cropland, noncropland, commercial farm roads, and significant earth moving activities (if applicable); and
   4. Any additional best management practices selected for high risk days as predicted by the Pinal County Dust Control Forecast.

D. Beginning in calendar year 2017, and no more than once every subsequent three calendar years, the Director, in conjunction with the Arizona Department of Agriculture, shall provide the commercial farmer with a Best Management Practices Program 3-year Survey. The commercial farmer shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA) by January 31, 2018, and every three years thereafter. The Survey information submitted to the ADA shall be compiled by the ADA without reference to a commercial farmer's name, shall aggregate the data from the Surveys received, and be submitted to the Department. The 3-year Survey shall include the following information:
   1. The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices;
   2. The signature of the commercial farmer and the date the form was signed;
   3. The acreage of each crop type planted/growing during the calendar year that the survey is conducted;
   4. The total miles of commercial farm roads at the commercial farm;
   5. The total acreage of the noncropland at the commercial farm;
   6. The best management practices selected for tillage, ground operations and harvest, cropland, noncropland, commercial farm roads, and significant earth moving activities (if applicable); and
   7. Any additional best management practices selected for high risk days as predicted by the Pinal County Dust Control Forecast.

E. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.

F. A person may develop different practices to control PM emissions not contained in subsections (B)(1) through (B)(6) and may submit such practices that are proven effective through on-farm demonstration trials to the Committee. The proposed new practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

G. A commercial farmer shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

H. The Director shall not assess a fee to a commercial farmer for coverage under the agricultural PM general permit.

I. A commercial farmer shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.
J. The Director shall document noncompliance with this Section before issuing a compliance order.
K. A commercial farmer who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-611. Definitions for R18-2-611.01

The definitions in R18-2-101 and the following definitions apply to R18-2-611.01~~:~~, R18-2-611.02, and R18-611.03:

1. The following definitions apply to a commercial dairy operation, a commercial beef feedlot, a commercial poultry facility, and commercial swine facility:
   a. "Animal waste handling and transporting" means the processes by which any animal excretions and mixtures containing animal excretions are collected and transported.
   b. "Arenas, corrals and pens" means areas where animals are confined for the purposes of, but not limited to, feeding, displaying, safety, racing, exercising, or husbandry.
   c. "Commercial animal operation" means a commercial dairy operation, a commercial beef feedlot, a commercial poultry facility, and a commercial swine facility, as defined in this Section.
   d. "Commercial animal operator" means an individual, entity, or joint operation in general control of a commercial animal operation.
   e. "Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following:
      i. Projected meteorological conditions, including:
         (1) Wind speed and direction,
         (2) Stagnation,
         (3) Recent precipitation, and
         (4) Potential for precipitation;
      ii. Existing concentrations of air pollution at the time of the forecast; and
      iii. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
   f. "High traffic areas" means areas that experience more than 20 VDT from 2 or more axle vehicles.
   g. "Maricopa PM nonattainment area" means the Phoenix planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.
   h. "Paved Public Road" means any paved roadways that are open to public travel and maintained by a City, County, State, or Federal entities.
   i. "Pinal County PM Nonattainment Area" means the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area, as defined in 40 CFR 81.303, and incorporated by reference in R18-2-210.
   j. "PM" includes both particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53; and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 CFR 50 Appendix J or by an equivalent method designated in accordance with 40 CFR 53, as incorporated by reference in Appendix 2.
   k. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).
   l. "Regulated area" means the regulated area as defined in A.R.S. § 49-457(P)(6).
   m. "Track-out control device" means minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved access connections and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.
   n. "Unpaved access connections" means any unpaved road connection which connects to a paved public road.
   o. "Unpaved roads or feed lanes" means roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation.
   p. "VDT" (Vehicle trips per day) means trips per day made by one vehicle, in one direction.

~~1~~2. The following definitions apply to a commercial dairy operation:
   a. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.
   b. "Apply a fibrous layer" means reducing PM_{10} emissions and soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Material shall be consistently applied to a minimum depth of two inches above the soil surface and coverage should be a minimum of 70 percent.

c. "Bunkers" means below ground level storage systems for storing large amount of silage, which is covered with a plastic tarp.
d. "Calves" means young dairy stock under two months of age.
e. "Cement cattle walkways to milk barn" means reducing PM_{10} emissions by fencing pathways from the corrals to the milking barn, ~~which are~~ restricting dairy cattle to surfaces with concrete floors.
~~f. "Commercial animal operator" means an individual, entity, or joint operation in general control of an animal operation.~~
~~g~~f. "Commercial dairy operation" means a dairy operation with more than 150 dairy cattle within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.
~~h~~g. "Cover manure hauling trucks" means reducing PM_{10} emissions by completely covering the top of the loaded area.
~~i~~h. "Covers for silage" means reducing PM_{10} emissions and wind erosion by using large plastic tarps to completely cover silage.
~~j~~i. "Do not run cattle" means reducing PM_{10} emissions by walking dairy cattle to the milking barn.
~~k~~j. "Feed higher moisture feed to dairy cattle" means reducing PM_{10} emissions by feeding dairy cattle one or ~~a~~ any combination of the following:
   i. Add water to ration mix to achieve a 20% minimum moisture level,
   ii. Add molasses or tallow to ration mix at a minimum of 1%,
   iii. Add silage, or
   iv. Add ~~Green~~ green ~~Chop~~ chop.
~~l~~k. "Feed green chop" means feeding high moisture feed that contains at least 30% moisture directly to dairy cattle.
~~m~~l. "Groom manure surface" means reducing PM_{10} emissions and wind erosion by:
   i. Flushing or vacuuming lanes daily,
   ii. Scraping and harrowing pens on a weekly basis, and
   iii. Removing manure every four months with equipment that leaves an even corral surface of compacted manure on top of the soil.
~~n~~m. "Hutches" means raised, roofed enclosures that protect the calves from the elements.
~~o~~n. "Pile manure between cleanings" means reducing PM_{10} emissions by collecting loose surface materials within the confines of the surface area of the occupied feed pen every two weeks. ~~to contain the loose manure materials.~~
~~p~~o. "Provide cooling in corral" means reducing PM_{10} emissions by using cooling systems ~~evaporative coolers~~ under the corral shades to reduce the ambient air temperature, thereby increasing stocking density in the cool areas of the corrals.
~~q~~p. "Provide shade in corral" means reducing PM_{10} emissions by increasing stocking density and reducing animal movement by using a permanent structure, which provides at least 16 square feet per animal of shaded pen surface.
~~r~~q. "Push equipment" means manure harvesting equipment pushed in front of a tractor.
~~s. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~
~~t. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~
~~u~~r. "Silage" means fermented, high-moisture fodder that can be fed to ruminants, such as cattle and sheep; usually made from grass crops including corn, sorghum or other cereals, by using the entire green plant.
~~v~~s. "Store and maintain feed stock" means reducing PM_{10} emissions and wind erosion by storing feed stock in a covered area where the commodity is surrounded on at least three sides by a structure. ~~so that the feed stock is adequately contained~~.
~~w~~t. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial dairy operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.
~~x~~u. "Use drag equipment to maintain pens" means reducing PM_{10} emissions by using manure ~~harvesting~~ equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions.
~~y~~v. "Use free stall housing" means reducing PM_{10} emissions by enclosing one cow per stall, which are outfitted with concrete floors.
~~z~~w. "Water misting systems" means reducing PM_{10} emissions from dry manure by using systems that project a cloud of very small water particles onto the manure surface, keeping the surface visibly moist.
~~aa~~x. "Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing

wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

~~2~~3. The following definitions apply to a commercial beef cattle feedlot:

a. "Add moisture to pen surface" means reducing PM_{10} emissions and wind erosion by applying at least three to six gallons of water per head/per day in pens occupied by beef cattle.

b. "Add molasses or tallow to feed" means reducing PM_{10} emissions by adding molasses or tallow so that it equals ~~five~~ three percent of the total ration.

c. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.

d. "Apply a fibrous layer in working areas" means reducing PM_{10} emissions and soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Material shall be consistently applied to a minimum depth of two inches above the soil surface and coverage should be a minimum of 70 percent.

e. "Bulk materials" means reducing PM_{10} emissions by using a closed conveyor system instead of vehicular means to move grain or other feedstuffs via non-vehicular means~~, distributing or hauling grain, supplements, or mixed feeds via motorized vehicle~~

~~f. "Commercial animal operator" means an individual, entity, or joint operation in general control of an animal operation.~~

~~g~~f. "Commercial beef cattle feedlot" means a beef cattle feedlot with more than 500 beef cattle within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.

~~h~~g. "Concrete apron" means reducing PM_{10} emissions by using solidly formed concrete surface, at least 4 inches thick on top of the soil surface, inside the feed pen for 8 feet approaching the feed bunk or water trough.

~~i~~h. "Control cattle during movements" means reducing PM_{10} emissions by suppressing the animal's ability to run by driving them forward while intruding on their "flight zones" or restraining the animal's movement.

~~j~~i. "Cover manure hauling trucks" means reducing PM_{10} emissions by completely covering the top of the loaded area.

~~k~~j. "Feed higher moisture feed to beef cattle" means reducing PM_{10} emissions by feeding beef cattle feed that contains at least 30% moisture.

~~l~~k. "Frequent manure removal" means reducing PM_{10} emissions and wind erosion by harvesting loose manure on top of the pen surface at least once every six months.

~~m. "Higher moisture feeds" means reduce PM_{10} emissions by feeding beef cattle feed that contains at least 30% moisture.~~

~~n. "Increase manure moisture" means reducing PM_{10} emissions by increasing the fluids consumed and excreted by cattle.~~

~~o~~l. "Pile manure between cleanings" means reducing PM_{10} emissions by collecting loose manure surface materials, by scraping or pushing, within the confines of the surface area of the occupied feed pen at least four times per year. ~~to contain the loose manure materials.~~

~~p~~m. "Provide shade in corral" means reducing PM_{10} emissions by increasing stocking density and reducing animal movement by using a permanent structure, which provides at least 16 square feet per animal of shaded pen surface.

~~q~~n. "Push equipment" means manure harvesting equipment pushed in front of a tractor.

~~r. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~

~~s. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~

~~t~~o. "Store and maintain feed stock" means reducing PM_{10} emissions and wind erosion by storing feed stock in a covered area where the commodity is surrounded on at least three sides by a structure. ~~so that the feed stock is adequately contained~~.

~~u~~p. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial beef feedlot with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~v~~q. "Use drag equipment to maintain pens" means reducing PM_{10} emissions by using manure harvesting equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions.

~~w~~r. "Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

~~3~~4. The following definitions apply to a commercial poultry facility:

a. "Add moisture through ventilation systems" means reducing PM_{10} emissions by using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while ~~adding sufficient~~ maintaining a minimum of 20% moisture in ~~to~~ the air within the housing system to bind small particles to larger particles.

b. "Add oil and/or moisture to the feed" means reducing PM_{10} emissions by adding a minimum of 1% edible oil and/or moisture to feed rations to bind small particles to larger particles.

c. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.

d. "Clean aisles between cage rows" means reducing PM_{10} emissions by cleaning the aisles between cage rows at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.

e. "Clean fans, louvers, and soffit inlets in a commercial poultry facility" means reducing PM_{10} emissions by cleaning fans, louvers, and soffit inlets when the facility is empty between depopulating and populating the facility.

f. "Clean floors and walls in a commercial poultry facility" means reducing PM_{10} emissions by cleaning floors and walls to prevent dried manure, spilled feed, and debris accumulation when the facility is empty between depopulating and populating the facility.

~~g. "Commercial animal operator" means an individual, entity, or joint operation in general control of an animal operation.~~

~~h~~g. "Commercial poultry facility" means a poultry operation with more than 25,000 egg laying hens within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.

~~i~~h. "Control vegetation on building exteriors" means reducing PM_{10} emissions by removing, cutting, or trimming vegetation that accumulates PM_{10} and restricts ventilation of the building, so as to leave approximately three feet between the vegetation and building.

~~j~~i. "Enclose transfer points" means reducing PM_{10} emissions by enclosing the points of transfer between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduce air contact with the feed rations during feed conveyance.

~~k~~j. "House in fully enclosed ventilated buildings" means reducing PM_{10} emissions by utilizing fully enclosed buildings with sufficient ventilation.

~~l~~k. "Maintain moisture in manure solids" means reducing PM_{10} emissions by maintaining a moisture content of a minimum of 15% in the solids sufficient to bind small particles to larger particles.

~~m~~l. "Minimize drop distance" means reducing PM_{10} emissions by designing the feed distribution system ~~to minimize the~~ so that the distance the feed ration drops from the feed distribution system into feeders is approximately 1 foot or less, which reduces air contact with the feed rations during feed conveyance.

~~n~~m. "Poultry" means any domesticated bird including chickens, turkeys, ducks, geese, guineas, ratites and squabs.

~~o. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~

~~p. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~

~~q~~n. "Remove spilled feed" means reducing PM_{10} emissions by removing spilled feed from the housing facility at least once every 14 days.

~~r~~o. "Stack separated manure solids" means reducing PM_{10} emissions and wind erosion by reducing the amount of exposed surface area of manure solids.

~~s~~p. "Store feed" means reducing PM_{10} emissions by storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage.

~~t~~q. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial poultry operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~u~~r. "Use enclosed feed distribution system" means reducing PM_{10} emissions by using an enclosed feed conveyance system that distributes feed rations throughout the housing facility, which reduces air contact with the feed rations during feed conveyance.

~~v~~s. "Use a flexible discharge spout" means reducing PM_{10} emissions and wind erosion at the time of bulk feed deliveries to the housing units by using a flexible discharge spout on the end of the feed truck transfer auger.

~~w~~t. "Use no bedding in the production facility" means reducing PM_{10} emissions by not using bedding such as wood shavings, sawdust, peanut hulls, straw, or other organic material.

~~4~~5. The following definitions apply to a commercial swine facility:

a. "Add oil and/or moisture to the feed" means reducing PM_{10} emissions by adding a minimum of 0.5% edible oil and/or moisture to feed rations to bind small particles to larger particles.

b. "Add moisture through ventilation systems" means reducing PM_{10} emissions by using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while ~~adding sufficient~~ maintaining minimum of 15% moisture ~~to~~ in the air within the housing system to bind small particles to larger particles.

c. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.

d. "Clean aisles between pens and stalls" means reducing PM_{10} emissions by cleaning the aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.

e. "Clean fans, louvers, and soffit inlets in a commercial swine facility" means reducing PM_{10} emissions by cleaning fans, louvers, and soffit inlets between transfer of animal groups, but in any case, at least every 6 months.

f. "Clean pens, floors and walls in a commercial swine facility" means reducing PM_{10} emissions by cleaning pens, floors, and walls between transfer of animal groups to prevent dried manure, spilled feed, and debris accumulation, but in any case, at least every 6 months.

~~g. "Commercial animal operator" means an individual, entity, or joint operation in general control of a animal operation.~~

~~h~~g. "Commercial swine facility" means a swine operation with more than 50 animal units for more than 30 consecutive days within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area. One thousand pounds equals one animal unit.

~~i~~h. "Control vegetation on building exteriors" means reducing PM_{10} emissions by removing, cutting, or trimming vegetation that accumulates PM_{10} and restricts ventilation of the building, so as to leave approximately three feet between the vegetation and the building.

~~j~~i. "Enclose transfer points" means reducing PM_{10} emissions by enclosing the points of transfer between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduces air contract with the feed rations during feed conveyance.

~~k~~j. "House in fully enclosed ventilated buildings" means reducing PM_{10} emissions by utilizing fully enclosed buildings with sufficient ventilation.

~~l~~k. "Lagoon" means a liquid manure storage and treatment pond.

~~m~~l. "Maintain moisture in manure solids" means reducing PM_{10} emissions by maintaining a minimum moisture content of 10% in the solids sufficient to bind small particles to larger particles.

~~n~~m. "Minimize drop distance" means reducing PM_{10} emissions by designing the feed distribution system ~~to minimize the~~ so that the distance the feed ration drops from the feed distribution system into feeders is three feet or less, which reduces air contact with the feed rations during feed conveyance.

~~o. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~

~~p. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~

~~q~~n. "Remove spilled feed" means reducing PM_{10} emissions by removing spilled feed from the housing facility at least once every 14 days.

~~r~~o. "Slatted flooring" means reducing PM_{10} emissions by using flooring that is a slotted concrete or wire-mesh floor set above a liquid manure collection pit, which allows the excrement to fall though the flooring into the liquid pit below, which prevents solids build-up. Slats 4 to 8 inches wide with spacing of about 1 inch in between are recommended.

~~sp~~. "Sloped concrete flooring" means reducing PM_{10} emissions by pouring concrete with a minimum of 0.25% grade inside of the barns which provides drainage and easier cleaning of floor areas.

~~tq~~. "Stack separated manure solids" means reducing PM_{10} emissions and wind erosion by reducing the amount of exposed surface area of manure solids.

~~ur~~. "Store feed" means reducing PM_{10} emissions by storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage.

~~vs~~. "Store separated manure solids" means reducing PM_{10} emissions by storing manure solids in a wind-blocked area behind a wall, structure, or area with natural wind protection to minimize blowing air movement over the manure stack.

~~wt~~. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial swine operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~xu~~. "Use a flexible discharge spout" means reducing PM_{10} emissions and wind erosion at the time of bulk feed deliveries to the housing units by using a flexible discharge spout on the end of the feed truck transfer auger.

~~yv~~. "Use enclosed feed distribution system" means reducing PM_{10} emissions by using an enclosed feed conveyance system that distributes feed rations throughout the housing facility, which reduces air contact with the feed rations during the feed conveyance.

~~zw~~. "Use no bedding in the production facility" means reducing PM_{10} emissions by not using bedding such as wood shavings, sawdust, peanut hulls, straw, or other organic material.

~~R18-2-611.01. Agricultural Animal Operations PM_{10} General Permit for Animal Operations; Moderate and Serious Maricopa County PM_{10} Nonattainment Areas Except Yuma County~~

~~A. A commercial animal operator in a regulated area shall comply with this Section by March 1, 2013.~~

~~B. A commercial animal operator, who begins a regulated agricultural activity after January 1, 2012, shall comply with this Section within 18 months of beginning the regulated agricultural activity.~~

~~C~~A. A commercial animal operator within a Serious PM_{10} Nonattainment Area shall implement at least two best management practices from each category to reduce PM_{10} emissions.

~~D. A commercial animal operator within a Moderate PM_{10} Nonattainment Area shall implement at least one best management practice from each category to reduce PM_{10} emissions.~~

~~E~~B. A commercial dairy operation shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Use free stall housing,
   b. Provide shade in corral,
   c. Provide cooling in corral,
   d. Cement cattle walkways to milk barn,
   e. Groom manure surface,
   f. Water misting systems,
   g. Use drag equipment to maintain pens,
   h. Pile manure between cleanings,
   i. Feed green chop,
   j. Keep calves in barns or hutches,
   k. Do not run cattle,
   l. Apply a fibrous layer, or
   m. Wind barrier.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to dairy cattle,
   b. Store and maintain feed stock,
   c. Covers for silage,
   d. Store silage in bunkers,
   ~~e. Increase manure moisture,~~
   ~~f~~e. Cover manure hauling trucks, or
   ~~g~~f. Do not load manure trucks with dry manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install signage to limit vehicle speed to 15 mph,
   b. Install speed control devices,
   c. Restrict access to through traffic,
   d. Install and maintain a track-out control device,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant, or

~~h.~~ Apply and maintain water as a dust suppressant.

4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant,
   i. Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks, or
   j. Apply and maintain pavement or cement feed lanes.

~~F~~C. A commercial beef cattle feedlot shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Concrete aprons,
   b. Provide shade in corral,
   c. Add moisture to pen surface,
   d. Manure removal,
   e. Pile manure between cleanings,
   ~~f. Increase Manure Moisture,~~
   ~~g~~f. Feed higher moisture feed to beef cattle,
   ~~h~~g. Control cattle during movements,
   ~~i~~h. Use drag equipment to maintain pens,
   ~~j~~i. Apply a fibrous layer, or
   ~~k~~j. Wind barrier.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to beef cattle,
   b. Add molasses or tallow to feed,
   c. Store and maintain feed stock,
   d. Bulk materials,
   e. Use drag equipment to maintain pens,
   f. Cover manure hauling trucks, or
   g. Do not load manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install and maintain a track-out control device,
   b. Apply and maintain pavement in high traffic areas,
   c. Apply and maintain aggregate cover,
   d. Apply and maintain synthetic particulate suppressant, or
   e. Apply and maintain water as a dust suppressant.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant, or
   i. Apply and maintain oil on roads or feed lanes.

~~G~~D. A commercial poultry facility shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. Clean fans, louvers, and soffit inlets in a commercial poultry facility~~;~~,
   b. Use no bedding~~;~~,
   c. Control vegetation on building exteriors~~;~~,
   d. Add moisture through ventilation systems~~;~~, or
   e. House in fully enclosed ventilated buildings.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,

c. Add oil and/or moisture to the feed,
d. Use enclosed feed distribution system,
e. Use flexible discharge spout,
f. Minimize drop distance,
g. Enclose transfer points,
h. Clean floors and walls in a commercial poultry facility,
i. Clean aisles between cage rows,
j. Stack separated manure solids, or
k. Maintain moisture in manure solids.

3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system, or
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water, or
   h. Apply and maintain oil on roads or feed lanes.

~~H~~E. A commercial swine facility shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. House in fully enclosed ventilated buildings~~;~~,
   b. Use no bedding~~;~~,
   c. Use a slatted floor system~~;~~,
   d. Use sloped concrete flooring~~;~~,
   e. Clean fans, louvers, and soffit inlets in a commercial swine facility~~;~~,
   f. Control vegetation on building exteriors~~;~~, or
   g. Add moisture through ventilation systems.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed~~;~~,
   b. Store feed~~;~~,
   c. Add oil and/or moisture to feed~~;~~,
   d. Use enclosed feed distribution system~~;~~,
   e. Use flexible discharge spout~~;~~,
   f. Minimize drop distance~~;~~,
   g. Enclose transfer points~~;~~,
   h. Clean pens, floors, and walls in a commercial swine facility~~;~~,
   i. Clean aisles between pens and stalls~~;~~,
   j. Store separated manure solids in a wind-blocked area~~;~~,
   k. Stack separated manure solids~~;~~,
   l. Maintain moisture in manure solids~~;~~, or
   m. Maintain liquid lagoon level.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system,
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water,

h. Apply and maintain oil on roads or feed lanes, or
i. Wind barrier.

~~I. Beginning March 31, 20132014, or within 90 days after the start of a new regulated agricultural activity, whichever is later, the commercial animal operator shall complete and submit a Best Management Practices Program General Permit Record Form to the Arizona Department of Agriculture. Thereafter, the commercial animal operator shall complete and submit the Best Management Practices Program General Permit Record Form by March 31st of each subsequent year. The Best Management Practices Program General Permit Record Form shall include the following information:~~

~~1. At least the required number of best management practices as described in subsection (C) or (D) that the commercial animal operator implemented during the previous calendar year;~~
~~2. At least the required number of best management practices as described in subsection (C) or (D) that the commercial animal operator intends to implement during the current calendar year;~~
~~3. The name, business address, and phone number of the commercial animal operator responsible for the preparation and implementation of the best management practices;~~
~~4. The signature of the commercial animal operator and the date the form was signed.~~

F. From and after December 31, 2015, a commercial animal operator who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial animal operator. The Best Management Practice Program General Permit Record form shall include the following information:

1. The name of the commercial animal operator, signature, and date signed,
2. The mailing address or physical address of the commercial animal operation, and
3. The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.

~~J. Beginning in Calendar Year 20142015, and no more than once every subsequent three calendar years, the Director shall provide the commercial animal operator with a Best Management Practices Program Periodic Survey. The commercial animal operator may complete and submit the survey to the Arizona Department of Agriculture. The Periodic Survey shall include the following information:~~

~~1. The number of animals in a commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;~~
~~2. The total miles of unpaved roads at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility; and~~
~~3. The total acreage of the unpaved access connections and equipment areas at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility.~~

~~K~~G. Beginning ~~March 31, 2013~~January 1, 2016, a commercial animal operator shall maintain records demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice and any changes to the best management practices. ~~identified in the most recently submitted Best Management Practices Program General Permit Record Form.~~ Records shall be kept by the commercial animal operator onsite and made available for review by the Director within two business days of notice to the commercial animal operator. ~~A commercial animal operator shall maintain a record demonstrating compliance with this Section for three years.~~

~~L~~H. A person may develop different practices not contained in subsection (B), (~~E~~C), (~~F~~D), or (~~G~~E), ~~or (H)~~ that reduce PM_{10} and may submit such practices that are proven effective through on-~~farm~~ operation demonstration trials to the Committee. The new best management practices shall not become effective unless ~~approved~~ submitted as described in A.R.S. § 49-457(L).

~~M~~I. The Director shall not assess a fee to a commercial animal operator for coverage under the agricultural PM_{10} general permit.

~~N~~J. A commercial animal operator shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

~~O~~K. The Director shall document noncompliance with this Section before issuing a compliance order.

~~P~~L. A commercial animal operator who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-611.02. Agricultural PM General Permit for Animal Operations; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area

A. A commercial animal operator within a Moderate PM Nonattainment Area, designated after June 1, 2009, shall implement at least one best management practice from each category to reduce PM emissions.

B. A commercial dairy operation shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Use free stall housing,
   b. Provide shade in corral,
   c. Provide cooling in corral,
   d. Cement cattle walkways to milk barn,
   e. Groom manure surface,
   f. Water misting systems,

g. Use drag equipment to maintain pens,
h. Pile manure between cleanings,
i. Feed green chop,
j. Keep calves in barns or hutches,
k. Do not run cattle,
l. Apply a fibrous layer, or
m. Wind barrier.

2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to dairy cattle,
   b. Store and maintain feed stock,
   c. Covers for silage,
   d. Store silage in bunkers,
   e. Cover manure hauling trucks, or
   f. Do not load manure trucks with dry manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install signage to limit vehicle speed to 15 mph,
   b. Install speed control devices,
   c. Restrict access to through traffic,
   d. Install and maintain a track-out control device,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant, or
   h. Apply and maintain water as a dust suppressant.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant,
   i. Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks, or
   j. Apply and maintain pavement or cement feed lanes.

C. A commercial beef cattle feedlot shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Concrete aprons,
   b. Provide shade in corral,
   c. Add moisture to pen surface,
   d. Manure removal,
   e. Pile manure between cleanings,
   f. Feed higher moisture feed to beef cattle,
   g. Control cattle during movements,
   h. Use drag equipment to maintain pens,
   i. Apply a fibrous layer, or
   j. Wind barrier.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to beef cattle,
   b. Add molasses or tallow to feed,
   c. Store and maintain feed stock,
   d. Bulk materials,
   e. Use drag equipment to maintain pens,
   f. Cover manure hauling trucks, or
   g. Do not load manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install and maintain a track-out control device,
   b. Apply and maintain pavement in high traffic areas,
   c. Apply and maintain aggregate cover,
   d. Apply and maintain synthetic particulate suppressant, or

e. Apply and maintain water as a dust suppressant.

4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant, or
   i. Apply and maintain oil on roads or feed lanes.

D. A commercial poultry facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. Clean fans, louvers, and soffit inlets in a commercial poultry facility,
   b. Use no bedding,
   c. Control vegetation on building exteriors;
   d. Add moisture through ventilation systems, or
   e. House in fully enclosed ventilated buildings.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to the feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,
   f. Minimize drop distance,
   g. Enclose transfer points,
   h. Clean floors and walls in a commercial poultry facility,
   i. Clean aisles between cage rows,
   j. Stack separated manure solids, or
   k. Maintain moisture in manure solids.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system, or
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water, or
   h. Apply and maintain oil on roads or feed lanes.

E. A commercial swine facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. House in fully enclosed ventilated buildings,
   b. Use no bedding,
   c. Use a slatted floor system,
   d. Use sloped concrete flooring,
   e. Clean fans, louvers, and soffit inlets in a commercial swine facility,
   f. Control vegetation on building exteriors, or
   g. Add moisture through ventilation systems.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,

f. Minimize drop distance,
g. Enclose transfer points,
h. Clean pens, floors, and walls in a commercial swine facility,
i. Clean aisles between pens and stalls,
j. Store separated manure solids in a wind-blocked area,
k. Stack separated manure solids,
l. Maintain moisture in manure solids, or
m. Maintain liquid lagoon level.

3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system,
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water,
   h. Apply and maintain oil on roads or feed lanes, or
   i. Wind barrier.

E. From and after December 31, 2015, a commercial animal operator who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial animal operator. The Best Management Practices Program General Permit Record Form shall include the following information:
   1. The name of the commercial animal operator, signature, and date signed,
   2. The mailing address or physical address of the commercial animal operation, and
   3. The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.

G. Beginning January 1, 2016, a commercial animal operator shall maintain records demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice and any changes to the best management practices. Records shall be kept by the commercial animal operator onsite and made available for review by the Director within two business days of notice to the commercial animal operator.

H. A person may develop different practices not contained in subsection (B), (C), (D), or (F) that reduce PM and may submit such practices that are proven effective through on-operation demonstration trials to the Committee. The new best management practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

I. The Director shall not assess a fee to a commercial animal operator for coverage under the agricultural PM general permit.

J. A commercial animal operator shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

K. The Director shall document noncompliance with this Section before issuing a compliance order.

~~L. A commercial animal operator who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).~~

R18-2-611.03. Agricultural PM General Permit for Animal Operations: Pinal County PM Nonattainment Area

A. A commercial animal operator within the Pinal County PM Nonattainment Area shall implement at least one best management practice from each category to reduce PM emissions.

B. In addition to subsection (A), on the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, commercial dairy operations within the Pinal County PM Nonattainment Area shall apply and maintain one of the four following BMPs on unpaved roads that experience more than 20 VDT from 2 or more axle vehicles:
   1. Apply and maintain pavement in high traffic areas,
   2. Apply and maintain aggregate cover,
   3. Apply and maintain synthetic particulate suppressant, or
   4. Apply and maintain water as a dust suppressant.

C. In addition to subsection (A), commercial beef feedlots within the Pinal County PM Nonattainment Area, shall add water to pen surface, as defined in R18-2-611(3)(a), on the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast.

D. A commercial dairy operation shall implement the following best management practices, as described in subsection (A), from each of the following categories:
   1. Arenas, Corrals, and Pens:

a. Use free stall housing,
b. Provide shade in corral,
c. Provide cooling in corral,
d. Cement cattle walkways to milk barn,
e. Groom manure surface,
f. Water misting systems,
g. Use drag equipment to maintain pens,
h. Pile manure between cleanings,
i. Feed green chop,
j. Keep calves in barns or hutches,
k. Do not run cattle,
l. Apply a fibrous layer, or
m. Wind barrier.

2. Animal Waste (and Feed) Handling and Transporting:
a. Feed higher moisture feed to dairy cattle,
b. Store and maintain feed stock,
c. Covers for silage,
d. Store silage in bunkers,
e. Cover manure hauling trucks, or
f. Do not load manure trucks with dry manure when wind exceeds 15 mph.

3. Unpaved Access Connections:
a. Install signage to limit vehicle speed to 15 mph,
b. Install speed control devices,
c. Restrict access to through traffic,
d. Install and maintain a track-out control device,
e. Apply and maintain pavement in high traffic areas,
f. Apply and maintain aggregate cover,
g. Apply and maintain synthetic particulate suppressant, or
h. Apply and maintain water as a dust suppressant.

4. Unpaved Roads or Feed Lanes:
a. Install engine speed governors on feed truck to 15 mph,
b. Install signage to limit vehicle speed to 15 mph,
c. Install speed control devices,
d. Restrict access to through traffic,
e. Apply and maintain pavement in high traffic areas,
f. Apply and maintain aggregate cover,
g. Apply and maintain synthetic particulate suppressant,
h. Apply and maintain water as a dust suppressant,
i. Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks, or
j. Apply and maintain pavement or cement feed lanes.

E. A commercial beef cattle feedlot shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens:
a. Concrete aprons,
b. Provide shade in corral,
c. Add water to pen surface,
d. Manure removal,
e. Pile manure between cleanings,
f. Feed higher moisture feed to beef cattle,
g. Control cattle during movements,
h. Use drag equipment to maintain pens,
i. Apply a fibrous layer, or
j. Wind barrier.

2. Animal Waste (and Feed) Handling and Transporting:
a. Feed higher moisture feed to beef cattle;
b. Add molasses or tallow to feed,
c. Store and maintain feed stock,
d. Bulk materials,
e. Use drag equipment to maintain pens,
f. Cover manure hauling trucks, or

g. Do not load manure when wind exceeds 15 mph.

3. Unpaved Access Connections:
   a. Install and maintain a track-out control device,
   b. Apply and maintain pavement in high traffic areas,
   c. Apply and maintain aggregate cover,
   d. Apply and maintain synthetic particulate suppressant, or
   e. Apply and maintain water as a dust suppressant.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant, or
   i. Apply and maintain oil on roads or feed lanes.

E. A commercial poultry facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. Clean fans, louvers, and soffit inlets in a commercial poultry facility,
   b. Use no bedding,
   c. Control vegetation on building exteriors,
   d. Add moisture through ventilation systems, or
   e. House in fully enclosed ventilated buildings.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to the feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,
   f. Minimize drop distance,
   g. Enclose transfer points,
   h. Clean floors and walls in a commercial poultry facility,
   i. Clean aisles between cage rows,
   j. Stack separated manure solids, or
   k. Maintain moisture in manure solids.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system, or
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water, or
   h. Apply and maintain oil on roads or feed lanes.

G. A commercial swine facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. House in fully enclosed ventilated buildings,
   b. Use no bedding,
   c. Use a slatted floor system,
   d. Use sloped concrete flooring,
   e. Clean fans, louvers, and soffit inlets in a commercial swine facility,
   f. Control vegetation on building exteriors, or
   g. Add moisture through ventilation systems,

2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,
   f. Minimize drop distance,
   g. Enclose transfer points,
   h. Clean pens, floors, and walls in a commercial swine facility,
   i. Clean aisles between pens and stalls,
   j. Store separated manure solids in a wind-blocked area,
   k. Stack separated manure solids,
   l. Maintain moisture in manure solids, or
   m. Maintain liquid lagoon level.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system,
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water,
   h. Apply and maintain oil on roads or feed lanes, or
   i. Wind barrier.

H. From and after December 31, 2015, a commercial animal operator who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial animal operator. The Best Management Practices Program General Permit Record Form shall include the following information:
1. The name of the commercial animal operator, signature, and date signed,
2. The mailing address or physical address of the commercial animal operation, and
3. The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.

I. Beginning in calendar year 2017, and no more than once every subsequent three calendar years, the Director shall provide the commercial animal operator with a Best Management Practices Program 3-year Survey. The commercial animal operator shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA) by January 31, 2018, and every three years thereafter. The Survey information submitted to the ADA shall be compiled by the ADA in a format that does not refer to a commercial animal operator's name, shall aggregate the data from the Surveys received, and be submitted to the Department. The 3-year Survey shall include the following information:
1. The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices;
2. The signature of the commercial farmer and the date the form was signed;
3. The number of animals in a commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;
4. The total miles of unpaved roads at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;
5. The total acreage of the unpaved access connections and equipment areas at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;
6. The best management practices selected for each category; and
7. For commercial dairy operations and beef cattle feedlots, an acknowledgement that water was applied on the day of a high risk day as predicted by the Pinal County Dust Control Forecast.

J. Beginning January 1, 2016, a commercial animal operator shall maintain records demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice and any changes to the best management practices. Records shall be kept by the commercial animal operator onsite and made available for review by the Director within two business days of notice to the commercial animal operator.

K. A person may develop different practices not contained in subsection (D), (E), (F), or (G) that reduce PM and may sub-

mit such practices that are proven effective through on-operation demonstration trials to the Committee. The new best management practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

L. The Director shall not assess a fee to a commercial animal operator for coverage under the agricultural PM general permit.

M. A commercial animal operator shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

N. The Director shall document noncompliance with this Section before issuing a compliance order.

O. A commercial animal operator who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-612. Definitions for ~~R18-2-613~~ R18-2-612.01

~~1. "Access restriction" means restricting or eliminating public access to noncropland with signs or physical obstruction.~~

~~2. "Aggregate cover" means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.~~

~~3. "Artificial wind barrier" means a physical barrier to the wind.~~

~~4. "Bed row spacing" means increasing or decreasing the size of a planting bed area to reduce the number of passes and soil disturbance by increasing plant density.~~

~~5. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.~~

~~6. "Chemical irrigation" means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.~~

~~7. "Combining tractor operations" means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.~~

~~8. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Yuma PM_{10} nonattainment area.~~

~~9. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.~~

~~10. "Conservation irrigation" means the use of drips, sprinklers, or underground lines to conserve water, and to reduce the weed population, the need for tillage, and soil compaction.~~

~~11. "Conservation tillage" means types of tillage that reduce the number of passes and the amount of soil disturbance.~~

~~12. "Cover crop" means plants or a green manure crop grown for seasonal soil protection or soil improvement.~~

~~13. "Critical area planting" means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.~~

~~14. "Cropland" means land on a commercial farm that:~~

~~a. Is within the time-frame of final harvest to plant emergence;~~

~~b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or~~

~~c. Is a turn-row.~~

~~15. "Cross-wind ridges" means soil ridges formed by a tillage operation.~~

~~16. "Cross-wind strip-cropping" means planting strips of alternating crops within the same field.~~

~~17. "Cross-wind vegetative strips" means herbaceous cover established in one or more strips within the same field.~~

~~18. "Equipment modification" means modifying agricultural equipment to prevent or reduce particulate matter generation from cropland.~~

~~19. "Limited activity during a high-wind event" means performing no tillage or soil preparation activity when the measured wind speed at six feet in height is more than 25 mph at the commercial farm site.~~

~~20. "Manure application" means applying animal waste or biosolids to a soil surface.~~

~~21. "Mulching" means applying plant residue or other material that is not produced onsite to a soil surface.~~

~~22. "Multi-year crop" means a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.~~

~~23. "Night farming" means performing regulated agricultural activities at night when moisture levels are higher and winds are lighter.~~

~~24. "Noncropland" means any commercial farmland that:~~

~~a. Is no longer used for agricultural production;~~

~~b. Is no longer suitable for production of crops;~~

~~c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or~~

~~d. Includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head.~~

~~25. "Permanent cover" means a perennial vegetative cover on cropland.~~

~~26. "Planting based on soil moisture" means applying water to soil before performing planting operations.~~

~~27. "Precision farming" means use of satellite navigation to calculate position in the field, to reduce overlap during field operations, and allow operations to occur during nighttime and inclement weather, thus generating less PM_{10}.~~

~~28. "Reduce vehicle speed" means operating farm vehicles or farm equipment on unpaved farm roads at speeds not to exceed 20 mph.~~

~~29. "Reduced harvest activity" means reducing the number of harvest passes using a mechanized method to cut and remove crops from a field.~~

~~30. "Regulated agricultural activity" means a commercial farming practice that may produce PM_{10} within the Yuma PM_{10} nonattainment area.~~
~~31. "Residue management" means managing the amount and distribution of crop and other plant residues on a soil surface.~~
~~32. "Sequential cropping" means growing crops in a sequence that minimizes the amount of time bare soil is exposed on a field.~~
~~33. "Surface roughening" means manipulating a soil surface to produce or maintain clods.~~
~~34. "Synthetic particulate suppressant" means a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, and polyacrylamide, an emulsion of a petroleum product, and an enzyme product that is used to control particulate matter.~~
~~35. "Tillage and harvest" means any mechanical practice that physically disturbs cropland or crops on a commercial farm.~~
~~36. "Tillage based on soil moisture" means applying water to soil before or during tillage, or delaying tillage to coincide with precipitation.~~
~~37. "Timing of a tillage operation" means performing tillage operations at a time that will minimize the soil's susceptibility to generate PM_{10}.~~
~~38. "Transgenic crops" means the use of genetically modified crops such as "herbicide ready" crops, which reduces the need for tillage or cultivation operations, and reduces soil disturbance.~~
~~39. "Track-out control system" means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road.~~
~~40. "Tree, shrub, or windbreak planting" means providing a woody vegetative barrier to the wind.~~
~~41. "Watering" means applying water to noncropland.~~
~~42. "Yuma PM_{10} nonattainment area" means the Yuma PM_{10} planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.~~

The definitions in R18-2-101 and the following definitions apply to R18-2-612.01:

1. "Access restriction" means reducing PM emission by reducing the number of trips driven on unpaved operation and maintenance and unpaved utility roads by restricting or eliminating public access by the used of signs or physical obstruction at locations that effectively control access to roads.
2. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads. The aggregate should be clean, hard and durable, and should be applied a depth sufficient to create soil stabilization in accordance with material specifications. A minimum depth of three inches is the standard in the absence of such specifications.
3. "Apply and maintain water" means reducing PM emissions and wind erosion by applying water to bare soil surfaces until the surfaces are visibly moist.
4. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM emissions from a regulated agricultural activity.
5. "Biological control of aquatic weeds" means reducing at least one trip, or to one trip if only one trip is needed, per treatment, made by vehicles for the purposes of removing aquatic weeds from canals by using fish, and other biologic means, within the canal through the use of to control the growth of aquatic weeds that reduce operating capacities and create debris that causes other operational issues.
6. "Canals" means facilities constructed for the sole purpose of the control, conveyance, and delivery of water. These facilities may be either open earthen channels, lined or unlined, or buried pipelines, which are used to convey water uphill and under obstructions, such as roadways and wash and river channels. These facilities include, but are not limited to, gate, inlet, outlet, safety, and measuring structures required to control water along the canals and deliver water to irrigation district customers, as well as compacted earthen banks constructed to protect these facilities from storm runoff events.
7. "Committee" means the Governor's Agricultural Best Management Practices Committee.
8. "Debris" means trash, rubble, and other non-soil materials.
9. "Dredge canals" means reducing PM emissions by mechanically removing muck, debris, and other foreign objects from canals while material is still wet or damp.
10. "Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following:
    a. Projected meteorological conditions, including:
        i. Wind speed and direction,
        ii. Stagnation,
        iii. Recent precipitation, and
        iv. Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and

c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

11. "Earth materials" means natural materials covering the ground surface, which includes, but are not limited to, dirt, rocks, or soil.
12. "Grading roadways" means mechanically smoothing and compacting the roadway surface.
13. "Irrigation District" means a political subdivision, governed by title 48, chapter 19.
14. "Limit activity" means performing only critical operational or emergency activity on a day forecast to be high risk for dust generation as forecasted by the Pinal County Dust Control Forecast.
15. "Major earth moving activities" means the mechanical movement of earth materials to reconstruct, relocate, reshape, reconfigure canals, including operation and maintenance roads and utility access roads.
16. "Maricopa PM nonattainment area" means the Phoenix planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.
17. "Minor earth moving activities" means the mechanical movement of earth materials to repair and maintain the existing configuration, location, bank slopes, or inclines of canals.
18. "Muck" means water that is saturated with mud, dirt, and soil, which accumulates over time along the bottom of canals.
19. "Paved Public Road" means any paved roadways that are open to public travel and maintained by a City, County, or the State.
20. "Pinal County PM Nonattainment Area" means the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area, as defined in 40 CFR 81.303, and incorporated by reference in R18-2-210.
21. "PM" includes both particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53; and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 CFR 50 Appendix J or by an equivalent method designated in accordance with 40 CFR 53, as incorporated by reference in Appendix 2.
22. "Reduce vehicle speed" means reducing PM emissions and soil erosion from the use of vehicles owned or operated by the irrigation district on unpaved operation, maintenance, and utility access roads, at speeds not to exceed 25 mph. This can be achieved through worker behavior modifications, signage, or any other necessary means.
23. "Regulated agricultural activity" means activities of an irrigation district, which affects those lands and facilities that are under the jurisdiction and control of an irrigation district, as described in § 49-457(P)(1)(f) and A.R.S. § 49-457(P)(5)(b).
24. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6)(c).
25. "Sediment" means muck that has dried after removal from canals.
26. "Supervisory control system" means a system that allows the irrigation district to control operational structures from a remote computer location in order to reduce at least one trip made by vehicles to access structures for operational purposes.
27. "Synthetic or natural particulate suppressant" means reducing PM emissions and wind erosion by providing a stabilized soil surface with organic material, such as muck, animal waste or biosolids, or with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide.
28. "Track-out control system" means minimizing any and all material that adheres to and agglomerates on all vehicles and equipment and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.
29. "Unauthorized use" means any travel or access by non-district personnel in non-district vehicles along roadways under the control of an irrigation district without the permission of the irrigation district.
30. "Unpaved operation and maintenance roads" means unpaved roadways that lay adjacent to canals, which provide access for irrigation district personnel and equipment for direct operation and maintenance of canals, and are under the control of the irrigation district.
31. "Unpaved utility access roads" means unpaved roadways used to provide access to canals, and also includes office and shop facilities, equipment yards, staging areas and other lands under the control of the irrigation district.
32. "Weed management" means reducing at least one trip made by vehicles for the purposes of removing weeds by using a combination of techniques, including organic, chemical, or biological means, to control weeds along canal banks and land surfaces not used for conveying water, excluding unpaved roadways.
33. "Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For

vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; PM Nonattainment Areas Designated After June 1, 2009

A. An irrigation district within a PM Nonattainment Area, designated after June 1, 2009, shall implement at least one best management practice from each of the following categories to reduce PM emissions:
   1. Unpaved operation and maintenance roads:
      a. Access restriction,
      b. Apply and maintain aggregate cover,
      c. Install supervisory control system to limit vehicle travel,
      d. Limit activity,
      e. Install signage to limit vehicle speed to 25 mph,
      f. Post warning signs for unauthorized use at point of entry to roads,
      g. Reduce vehicle speed,
      h. Install and maintain a track-out control system,
      i. Apply and maintain synthetic or natural particulate suppressant,
      j. Apply and maintain water before, during, and after major and minor earth moving activities,
      k. Apply and maintain water when grading roadways,
      l. Use paved non-district or paved public roads to access structures, or
      m. Install wind barriers.
   2. Canals:
      a. Dredge canals while muck or debris is still wet,
      b. Dispose of muck or debris while still damp,
      c. Weed management,
      d. Biological control of aquatic weeds, or
      e. Apply and maintain water before, during and after major and minor earth moving activities.
   3. Unpaved utility access roads:
      a. Access restriction,
      b. Apply and maintain aggregate cover,
      c. Limit activity,
      d. Install signage to limit vehicle speed to 25 mph,
      e. Post warning signs for unauthorized use at points of entry to roads,
      f. Reduce vehicle speed,
      g. Install and maintain a track-out control system,
      h. Apply and maintain pavement,
      i. Apply and maintain synthetic or natural particulate suppressant,
      j. Apply and maintain water before, during and after major and minor earth moving activities,
      k. Apply and maintain water when grading roadways,
      l. Use paved non-district or paved public roads to access structures, or
      m. Install wind barriers.

B. From and after December 31, 2015, an irrigation district engaged in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the irrigation district. The Best Management Practice Program General Permit Record form shall include the following information:
   1. The name, business address, and of the of the irrigation district representative responsible for the preparation and implementation of the best management practices;
   2. The signature of the irrigation district representative and the date the form was signed; and
   3. The best management practice selected for unpaved operation and utility roads, canals, and unpaved utility access roads.

C. Beginning in calendar year 2017, and no more than once every subsequent three calendar years, the Director, in conjunction with the Arizona Department of Agriculture, shall provide the irrigation district with a Best Management Practices Program 3-year Survey. The irrigation district shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA) by January 31, 2018, and every three years thereafter. The Survey information submitted to the ADA shall be compiled by the ADA then be submitted to the Department. The 3-year Survey shall include the following information:
   1. The name, business address, and phone number of the irrigation district representative responsible for the preparation and implementation of the best management practices;
   2. The signature of the irrigation district representative and the date the form was signed;
   3. The total miles of canals that the irrigation district controls;
   4. The total miles of unpaved operation and maintenance roads;

5. The total miles of the unpaved utility access roads; and
6. The best management practices selected for unpaved operation and utility roads, canals, and unpaved utility access roads.

D. Records of any changes to those Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the irrigation district onsite and made available for review by the Director within two business days of notice to the irrigation district by the Department.

E. An irrigation district may develop different practices not contained in either of the categories of subsection (A)(1), (A)(2), or (A)(3) that reduce PM and may submit such practices that are proven effective through in-district trials. The proposed new practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

F. An irrigation district shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

G. The Director shall not assess a fee to an irrigation district for coverage under the agricultural PM general permit.

H. An irrigation district shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

I. The Director shall document noncompliance with this Section before issuing a compliance order.

J. An irrigation district that is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

~~R18-2-613. Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices~~ ~~Definitions for R18-2-613.01~~

~~A. A commercial farmer shall comply with this Section by August 1, 2005.~~

~~B. A commercial farmer who begins a regulated agricultural activity after August 1, 2005, shall comply with this Section within 60 days after beginning the regulated agricultural activity.~~

~~C. A commercial farmer shall implement at least one of the best management practices from each of the following categories at each commercial farm:~~

~~1. Tillage and harvest, subsection (E);~~
~~2. Noncropland, subsection (F); and~~
~~3. Cropland, subsection (G).~~

~~D. A commercial farmer shall ensure that the implementation of each selected best management practice does not violate any other local, state, or federal law.~~

~~E. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from tillage and harvest:~~

~~1. Bed row spacing;~~
~~2. Chemical irrigation;~~
~~3. Combining tractor operations;~~
~~4. Conservation irrigation;~~
~~5. Conservation tillage;~~
~~6. Equipment modification;~~
~~7. Limited activity during a high-wind event;~~
~~8. Multi-year crop;~~
~~9. Night farming;~~
~~10. Planting based on soil moisture;~~
~~11. Precision farming;~~
~~12. Reduced harvest activity;~~
~~13. Tillage based on soil moisture;~~
~~14. Timing of a tillage operation, or~~
~~15. Transgenic crops.~~

~~F. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from noncropland:~~

~~1. Access restriction;~~
~~2. Aggregate cover;~~
~~3. Artificial wind barrier;~~
~~4. Critical area planting;~~
~~5. Manure application;~~
~~6. Reduce vehicle speed;~~
~~7. Synthetic particulate suppressant;~~
~~8. Track-out control system;~~
~~9. Tree, shrub, or windbreak planting; or~~
~~10. Watering.~~

~~G. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from cropland:~~

~~1. Artificial wind barrier;~~

~~2. Cover crop;~~
~~3. Cross-wind ridges;~~
~~4. Cross-wind strip-cropping;~~
~~5. Cross-wind vegetative strips;~~
~~6. Manure application;~~
~~7. Mulching;~~
~~8. Multi-year crop;~~
~~9. Permanent cover;~~
~~10. Planting based on soil moisture;~~
~~11. Precision farming;~~
~~12. Residue management;~~
~~13. Sequential cropping;~~
~~14. Surface roughening; or~~
~~15. Tree, shrub, or windbreak planting.~~

~~H. A person may develop different practices not contained in subsections (E), (F), or (G) that reduce PM_{10}. A person may submit practices that are proven effective through on-farm demonstration trials to the Director. The Director shall review the submitted practices.~~

~~I. A commercial farmer shall maintain records demonstrating compliance with this Section. The commercial farmer shall provide the records to the Director within two business days of written notice to the commercial farmer. The records shall contain:~~

~~1. The name of the commercial farmer,~~
~~2. The mailing address or physical location of the commercial farm, and~~
~~3. The best management practices selected for tillage and harvest, noncropland, and cropland by the commercial farmer, and the date each best management practice was implemented.~~

1. "Access restriction" means restricting or eliminating public access to noncropland with signs or physical obstruction.
2. "Aggregate cover" means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.
3. "Artificial wind barrier" means a physical barrier to the wind.
4. "Bed row spacing" means increasing or decreasing the size of a planting bed area to reduce the number of passes and soil disturbance by increasing plant density.
5. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.
6. "Chemical irrigation" means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.
7. "Combining tractor operations" means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.
8. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Yuma PM_{10} nonattainment area.
9. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.
10. "Conservation irrigation" means the use of drips, sprinklers, or underground lines to conserve water, and to reduce the weed population, the need for tillage, and soil compaction.
11. "Conservation tillage" means types of tillage that reduce the number of passes and the amount of soil disturbance.
12. "Cover crop" means plants or a green manure crop grown for seasonal soil protection or soil improvement.
13. "Critical area planting" means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.
14. "Cropland" means land on a commercial farm that:
    a. Is within the time-frame of final harvest to plant emergence;
    b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
    c. Is a turn-row.
15. "Cross-wind ridges" means soil ridges formed by a tillage operation.
16. "Cross-wind strip-cropping" means planting strips of alternating crops within the same field.
17. "Cross-wind vegetative strips" means herbaceous cover established in one or more strips within the same field.
18. "Equipment modification" means modifying agricultural equipment to prevent or reduce particulate matter generation from cropland.
19. "Limited activity during a high-wind event" means performing no tillage or soil preparation activity when the measured wind speed at six feet in height is more than 25 mph at the commercial farm site.
20. "Manure application" means applying animal waste or biosolids to a soil surface.
21. "Mulching" means applying plant residue or other material that is not produced onsite to a soil surface.
22. "Multi-year crop" means a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.

23. "Night farming" means performing regulated agricultural activities at night when moisture levels are higher and winds are lighter.
24. "Noncropland" means any commercial farmland that:
    a. Is no longer used for agricultural production;
    b. Is no longer suitable for production of crops;
    c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or
    d. Includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head.
25. "Permanent cover" means a perennial vegetative cover on cropland.
26. "Planting based on soil moisture" means applying water to soil before performing planting operations.
27. "Precision farming" means use of satellite navigation to calculate position in the field, to reduce overlap during field operations, and allow operations to occur during nighttime and inclement weather, thus generating less PM_{10}.
28. "Reduce vehicle speed" means operating farm vehicles or farm equipment on unpaved farm roads at speeds not to exceed 20 mph.
29. "Reduced harvest activity" means reducing the number of harvest passes using a mechanized method to cut and remove crops from a field.
30. "Regulated agricultural activity" means a commercial farming practice that may produce PM_{10} within the Yuma PM_{10} nonattainment area.
31. "Residue management" means managing the amount and distribution of crop and other plant residues on a soil surface.
32. "Sequential cropping" means growing crops in a sequence that minimizes the amount of time bare soil is exposed on a field.
33. "Surface roughening" means manipulating a soil surface to produce or maintain clods.
34. "Synthetic particulate suppressant" means a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, and polyacrylamide, an emulsion of a petroleum product, and an enzyme product that is used to control particulate matter.
35. "Tillage and harvest" means any mechanical practice that physically disturbs cropland or crops on a commercial farm.
36. "Tillage based on soil moisture" means applying water to soil before or during tillage, or delaying tillage to coincide with precipitation.
37. "Timing of a tillage operation" means performing tillage operations at a time that will minimize the soil's susceptibility to generate PM_{10}.
38. "Transgenic crops" means the use of genetically modified crops such as "herbicide ready" crops, which reduces the need for tillage or cultivation operations, and reduces soil disturbance.
39. "Track-out control system" means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road.
40. "Tree, shrub, or windbreak planting" means providing a woody vegetative barrier to the wind.
41. "Watering" means applying water to noncropland.
42. "Yuma PM_{10} nonattainment area" means the Yuma PM_{10} planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.

R18-2-613.01. ~~Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices~~

A. A commercial farmer shall comply with this Section by August 1, 2005.
B. A commercial farmer who begins a regulated agricultural activity after August 1, 2005, shall comply with this Section within 60 days after beginning the regulated agricultural activity.
C. A commercial farmer shall implement at least one of the best management practices from each of the following categories at each commercial farm:
    1. Tillage and harvest, subsection (E);
    2. Noncropland, subsection (F); and
    3. Cropland, subsection (G).
D. A commercial farmer shall ensure that the implementation of each selected best management practice does not violate any other local, state, or federal law.
E. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from tillage and harvest:
    1. Bed row spacing,
    2. Chemical irrigation,
    3. Combining tractor operations,
    4. Conservation irrigation,
    5. Conservation tillage,
    6. Equipment modification,
    7. Limited activity during a high-wind event,
    8. Multi-year crop,
    9. Night farming,

10. Planting based on soil moisture,
11. Precision farming,
12. Reduced harvest activity,
13. Tillage based on soil moisture,
14. Timing of a tillage operation, or
15. Transgenic crops.

F. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from noncropland:
1. Access restriction;
2. Aggregate cover;
3. Artificial wind barrier;
4. Critical area planting;
5. Manure application;
6. Reduce vehicle speed;
7. Synthetic particulate suppressant;
8. Track-out control system;
9. Tree, shrub, or windbreak planting; or
10. Watering.

G. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from cropland:
1. Artificial wind barrier;
2. Cover crop;
3. Cross-wind ridges;
4. Cross-wind strip-cropping;
5. Cross-wind vegetative strips;
6. Manure application;
7. Mulching;
8. Multi-year crop;
9. Permanent cover;
10. Planting based on soil moisture;
11. Precision farming;
12. Residue management;
13. Sequential cropping;
14. Surface roughening; or
15. Tree, shrub, or windbreak planting.

H. A person may develop different practices not contained in subsections (E), (F), or (G) that reduce PM_{10}. A person may submit practices that are proven effective through demonstration trials to the Director. The Director shall review the submitted practices.

I. A commercial farmer shall maintain records demonstrating compliance with this Section. The commercial farmer shall provide the records to the Director within two business days of written notice to the commercial farmer. The records shall contain:
1. The name of the commercial farmer,
2. The mailing address or physical location of the commercial farm, and
3. ~~The best management practices selected for tillage and harvest, noncropland, and cropland by the commercial farmer, and the date each best management practice was implemented.~~

APPENDIX 2. TEST METHODS AND PROTOCOLS

The following test methods and protocols are approved for use as directed by the Department under this Chapter. These standards are incorporated by reference as applicable requirements revised as of July 1, 2006, and no future editions or amendments. These standards are on file with the Department, and are also available from the U.S. Government Printing Office, Superintendent of Documents, bookstore.gpo.gov, Mail Stop: SSOP IDCC-SSOM, Washington, D.C. 20402-9328.

~~1.~~A. 40 CFR 50;
~~2.~~B. 40 CFR 50, Appendices A through N;
~~3.~~C. 40 CFR 51, Appendix M, Section IV of Appendix S, and Appendix W;
~~4.~~D. 40 CFR 52, Appendices D and E;
~~5.~~E. 40 CFR 53;
~~6.~~F. 40 CFR 58;
~~7.~~G. 40 CFR 58, all appendices;
~~8.~~H. 40 CFR 60, all appendices;
~~9.~~I. 40 CFR 61, all appendices;
~~10.~~J. 40 CFR 63, all appendices;
~~11.~~K. 40 CFR 75, all appendices.

L. 40 CFR 51.128, Appendix A(1)(B).

M. Silt Content Test Method. The purpose of this test method is to estimate the silt content of the trafficked parts of commercial farm roads, as defined in R18-2-610. The higher the silt content, the more fine dust particles that are released when cars and trucks drive on commercial farm roads.

1. Equipment:
   a. A set of sieves with the following openings: 4 millimeters (mm), 2mm, 1 mm, 0.5 mm and 0.25 mm and a lid and collector pan
   b. A small whisk broom or paintbrush with stiff bristles and dustpan 1 ft. in width. (The broom/brush should preferably have one, thin row of bristles no longer than 1.5 inches in length.)
   c. A spatula without holes A small scale with half ounce increments (e.g. postal/package scale)
   d. A shallow, lightweight container (e.g. plastic storage container)
   e. A sturdy cardboard box or other rigid object with a level surface
   f. Basic calculator
   g. Cloth gloves (optional for handling metal sieves on hot, sunny days)
   h. Sealable plastic bags (if sending samples to a laboratory)
   i. Pencil/pen and paper
2. Step 1: Look for a routinely-traveled surface, as evidenced by tire tracks. [Only collect samples from surfaces that are not wet or damp due to precipitation, dew or watering.] Use caution when taking samples to ensure personal safety with respect to passing vehicles. Gently press the edge of a dustpan (1 foot in width) into the surface four times to mark an area that is 1 square foot. Collect a sample of loose surface material using a whisk broom or brush and slowly sweep the material into the dustpan, minimizing escape of dust particles. Use a spatula to lift heavier elements such as gravel. Only collect dirt/gravel to an approximate depth of 3/8 inch or 1 cm in the 1 square foot area. If you reach a hard, underlying subsurface that is < 3/8 inch in depth, do not continue collecting the sample by digging into the hard surface. In other words, you are only collecting a surface sample of loose material down to 1 cm. In order to confirm that samples are collected to 1 cm. in depth, a wooden dowel or other similar narrow object at least one foot in length can be laid horizontally across the survey area while a metric ruler is held perpendicular to the dowel. At this point, you can choose to place the sample collected into a plastic bag or container and take it to an independent laboratory for silt content analysis. A reference to the procedure the laboratory is required to follow is in subsection (10) below.
3. Step 2: Place a scale on a level surface. Place a lightweight container on the scale. Zero the scale with the weight of the empty container on it. Transfer the entire sample collected in the dustpan to the container, minimizing escape of dust particles. Weigh the sample and record its weight.
4. Step 3: Stack a set of sieves in order according to the size openings specified above, beginning with the largest size opening (4 mm) at the top. Place a collector pan underneath the bottom (0.25 mm) sieve.
   Step 4: Carefully pour the sample into the sieve stack, minimizing escape of dust particles by slowly brushing material into the stack with a whisk broom or brush. (On windy days, use the trunk or door of a car as a wind barricade.) Cover the stack with a lid. Lift up the sieve stack and shake it vigorously up, down and sideways for at least 1 minute.
5. Step 5: Remove the lid from the stack and disassemble each sieve separately, beginning with the top sieve. As you remove each sieve, examine it to make sure that all of the material has been sifted to the finest sieve through which it can pass; e.g. material in each sieve (besides the top sieve that captures a range of larger elements) should look the same size. If this is not the case, re-stack the sieves and collector pan, cover the stack with the lid, and shake it again for at least 1 minute. (You only need to reassemble the sieve(s) that contain material which requires further sifting.)
6. Step 6: After disassembling the sieves and collector pan, slowly sweep the material from the collector pan into the empty container originally used to collect and weigh the entire sample. Take care to minimize escape of dust particles. You do not need to do anything with material captured in the sieves -- only the collector pan. Weigh the container with the material from the collector pan and record its weight.
7. Step 7: If the source is an unpaved road, multiply the resulting weight by 0.38. If the source is an unpaved parking lot, multiply the resulting weight by 0.55. The resulting number is the estimated silt loading. Then, divide by the total weight of the sample you recorded earlier in Step 2 and multiply by 100 to estimate the percent silt content.
8. Step 8: Select another two routinely-traveled portions of the unpaved road or unpaved parking lot and repeat this test method. Once you have calculated the silt loading and percent silt content of the three samples collected, average your results together.
9. Step 9: Examine Results. If the average silt loading is less than 0.33 oz/ft&sup2, the surface is STABLE. If the average silt loading is greater than or equal to 0.33 oz/ft&sup2, then proceed to examine the average percent silt content. If the source is an unpaved road and the average percent silt content is 6% or less, the surface is STABLE. If the source is an unpaved parking lot and the average percent silt content is 8% or less, the surface is STABLE. If your field test results are within 2% of the standard (for example, 4%-8% silt content on an unpaved road), it is recommended that you collect three additional samples from the source according to Step 1 and take them to an independent laboratory for silt content analysis.

10. Independent Laboratory Analysis: You may choose to collect three samples from the source, according to Step 1, and send them to an independent laboratory for silt content analysis rather than conduct the sieve field procedure. If so, the test method the laboratory is required to use comes from the from the following text: *Procedures For Laboratory Analysis Of Surface/Bulk Dust Loading Samples*, (Fifth Edition, Volume I, Appendix C.2.3 "Silt Analysis", 1995), AP-42, Office of air Quality Planning & Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

Exhibit G-VII:

Certified Final Rule - Pinal County Construction Sites - Fugitive Dust Rule for West Pinal PM10 Nonattainment Area (Construction Rule)

MICHELE REAGAN
Secretary of State
State of Arizona

UNITED STATES OF AMERICA)
) SS.
STATE OF ARIZONA)

I, MICHELE REAGAN, SECRETARY OF STATE, DO HEREBY CERTIFY THAT THE ATTACHED IS A COMPLETE, TRUE, AND CORRECT COPY OF THE FOLLOWING PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AS PUBLISHED IN THE ARIZONA ADMINISTRATIVE REGISTER, VOLUME 21, ISSUE 47, NOVEMBER 20, 2015: 1-1-105, 4-3-160, 4-3-170, 4-3-180, AND 4-3-190.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done this 21st day of December, 2015.

Michele Reagan

MICHELE REAGAN
Secretary of State

1700 W. Washington Street, Fl. 7
Phoenix, Arizona 85007-2808
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www.azsos.gov

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING
PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-290]

1. **Preamble**

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The adopted construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity, ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the adopted rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections 160, 170, 180, 190) through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the

comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.
        b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
        c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where dust is required to test and validate the design integrity, product quality, etc.
        d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).
        e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.
        f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
        g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.
3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.
4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A – For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B – For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and

3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
   a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
   b) All dust generating operations are ceased and disturbed surface areas are stabilized.

Subsection C – Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.

1. Application form requirements.
   a) Applicant must provide essential identification on an application form approved by the control officer. Separate application forms required for non-contiguous areas, unless it's an annual block permit.
   b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.
   c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.
   d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.
   e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).
      a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application for more than one job site, though each work site has to be described in the application along with what type of dust generating operations are to be conducted.
      b. Area block applications are only available to
         i. Political subdivisions and
         ii. Public utility corporations regulated by the Arizona Corporation Commission and
         iii. Contractors or subcontractors for political subdivisions or public utility corporations
      c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.
      d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and type of dust generating operation, control measures used and start date.
2. Permit and recordkeeping requirements.
   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work site at all times dust generating operations are taking place. The permit is to reside on the work site.

b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.

c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.

d) Completion of project notification to Control Officer – no later than 30 days after completion.

e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.

f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)

·Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.

·Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:

1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:

a) All dust generating operations are ceased until the opacity violations are no longer taking place, or

b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.

2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

There are estimated small incremental costs to the businesses potentially affected by the adopted construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these adopted rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time.

The stabilization requirements of the adopted rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule adoption for water use wouldn't be additionally burdensome.

Pinal County
Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).
Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:
Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:
Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132
http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1715, August 28, 2015.
Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1716, August 28, 2015

2. The full text of the adopted changes follows:

~~**1-1-105. SIP list**~~

A. ~~As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:~~

1. ~~Chapter 1~~
   a. ~~Article 1. (As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.~~
   b. ~~Article 2. (As amended 5/14/97 and 7/12/00) except for §1-2-110.~~
   c. ~~Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")~~
2. ~~Chapter 2~~
   a. ~~Article 1. (As amended 10/12/95).~~
   b. ~~Article 2. (As amended 5/14/97).~~
   c. ~~Article 3. (As amended 10/12/95).~~
   d. ~~Article 4. (As amended 10/12/95).~~

e. Article 5. (As amended 10/12/95).
f. Article 6. (As amended 10/12/95).
g. Article 7. (As amended 10/12/95).
h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)
      ii. §4-3-170 (As amended 10/28/15)
      iii. §4-3-180 (As amended 10/28/15)
      iv. §4-3-190 (As amended 10/28/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of

Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. ~~§5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*~~
24. ~~§5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*~~

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.

Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

   This definition excludes those permanently stabilized areas that have:

   a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
   b. Been paved or otherwise covered by a permanent structure; or
   c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

   a) Earthmoving activities
   b) Land clean-up, leveling, back filling
   c) Drilling
   d) Construction
   e) Demolition
   f) Bulk material handling, storage and/or transporting operations
   g) Operation of motorized machinery used in Construction
   h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
   i) Installing initial landscapes using mechanized equipment

   For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.
9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.
11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and

c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.

20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.

21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).

22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.

23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.

24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).

25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.

26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.

27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.

    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:

        i. Trenches less than four feet in depth, that exceed a length of 726 feet;

        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;

    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.

    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:

1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.

2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:

1. Install suitable trackout control prior to the start of dust generating operations;

2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and

3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:
    a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or
    b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
    a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
    b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
    c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
    d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
    e. Annual Area Block Application:
        i. Area block applications shall only be available for dust generating operations associated with:
            a) Maintenance of existing underground or above-ground lines;
            b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
            c) Underground utility line extensions not exceeding 500' in length; and
            d) Overhead utility line extensions; and
            e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.
        ii. Area block applications shall only be available to:
            a) Political subdivisions; and
            b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
            c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations
        iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.
        iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.
        v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.
        vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the

dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:
   a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.
   b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).
   c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.
   d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project.
   e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.
   f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:
      i. Project Name
      ii. Name and phone number of person(s) responsible for conducting project
      iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:
   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

Exhibit G-VIII:

Certified Final Rule - Pinal County West Pinal PM10 Moderate Nonattainment Area Fugitive Dust Rule (Fugitive Dust Rule)

MICHELE REAGAN
Secretary of State
State of Arizona

UNITED STATES OF AMERICA)
) SS.
STATE OF ARIZONA)

I, MICHELE REAGAN, SECRETARY OF STATE, DO HEREBY CERTIFY THAT THE ATTACHED IS A COMPLETE, TRUE, AND CORRECT COPY OF THE FOLLOWING PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AS PUBLISHED IN THE ARIZONA ADMINISTRATIVE REGISTER, VOLUME 21, ISSUE 47, NOVEMBER 20, 2015: 1-1-105, 4-1-010, 4-1-015, 4-1-020, 4-1-030, 4-1-040, 4-1-045, 4-1-050, AND 4-1-060.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done this 21st day of December, 2015.

Michele Reagan

MICHELE REAGAN
Secretary of State

1700 W. Washington Street, Fl. 7
Phoenix, Arizona 85007-2808
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COUNTY NOTICES ACCORDING TO A.R.S. § 49-112

This section of the *Arizona Administrative Register* contains County Notices (according to A.R.S. § 49-112).

Each county writes rules and regulations in its own unique style. Although these notices are published in the *Register*, they do not conform to the standards specified in the *Arizona Rulemaking Manual*. With the exception of minor formatting changes, County Notices (including subsection labeling, spelling, grammar, and punctuation) are reproduced as submitted.

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING

PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-289]

1. **Preamble**

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The adopted rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These adopted general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions for the aforementioned land use categories. In addition the adopted rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The Pinal County Board of Supervisors adopted the proposed additions and amendments listed in section B below at their October 28, 2015 meeting.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Amendment of Chapter 4, Article 1, §010,
   - Amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.
3. Addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:
   - Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
   - Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
   - Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
   - Dust generating operations (i.e. construction).
   - Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
4. Addition of Chapter 4, Article 1, §020 (Definitions),
   - Sixteen definitions directly related to these rules.
5. Addition of Chapter 4, Article 1, §030 (Standards)
   - Subsection 1 – General requirements
     - A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be

subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.

B. The owner and/or operator shall implement applicable control measures.

C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.

D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.

- Subsection 2 – Open areas/vacant lots
  - A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
  - B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
  - C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.
  - D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.
  - E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.
  - F. Compliance determination.
- Subsection 3 – Unpaved lots
  - A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
  - B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.
- Subsection 4 – Unpaved roads
  - A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
  - B. Control measures are considered effectively implemented when:
    - i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
      - a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
        - i. Done on unpaved roads previously untreated, and
        - ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
        - iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.
- Subsection 5 – Paved public roadway
  - A. Trackout cleanup provisions for trackout that extends 50 feet or more.
    - i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
    - ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
    - iii. Trackout cleanup extension provision

B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Addition of Chapter 4, Article 1, §050 (Records retention)

Two year records retention requirement.

8. Addition of Chapter 4, Article 1, §060 (Violations)

Violation provisions for these rules.

Violation exemptions include:

i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.

ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

Open areas/Vacant lots

There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the adopted 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the adopted 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The adopted rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to the surface area disturbed prior to, during and after the weed abatement. The adopted rules include additional trackout requirements associated with weed abatement activities. All of these new adopted restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold adopted (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the adopted rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection

4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road is $100,000 per mile. Assuming the 15 miles per year requirement in §4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the adopted rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The adopted rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987

Florence, AZ. 85132
http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the adopted rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1730, August 28, 2015.
Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1731, August, 28, 2015

2. The full text of the adopted changes follows:

~~**1-1-105. SIP list**~~

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:

1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:

1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. ~~§5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*~~
24. ~~§5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*~~

ARTICLE 1. ~~ADOPTED DOCUMENTS~~

WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C., Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES – as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY – as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE – As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
   a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
   b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
   c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
       i) Wind speed and direction,
       ii) Stagnation,
       iii) Recent precipitation, and
       iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and

storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. GENERAL REQUIREMENTS

A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.

B. The owner and/or operator shall implement applicable control measures.

C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.

D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. OPEN AREAS/VACANT LOTS

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:

i. No trespassing signs

ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

i. Apply and maintain water or dust suppressants; or

ii. Establish vegetation; or

iii. Install and maintain pavement; or

iv. Apply and maintain gravel uniformly; or

v. Apply and maintain chemical/organic stabilizers/suppressants; or

vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.

ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.

iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:

i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or

ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or

iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or

iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or

v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8%;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or

c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or

d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply and maintain dust suppressants other than water; or

c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and
2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:
In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.
10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)

a. Manually sweeping and picking up; or
b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
c. Operating a PM10 efficient street sweeper; or
d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.

ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.

B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:

i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.

ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

Appendix G

Rules, Statutes, or Other Documents for Approval

Exhibit G-I:

Certified A.R.S. § 49-424 (2015) Duties of department (revised high risk forecast mandate included)

STATE OF ARIZONA)
) ss:
COUNTY OF MARICOPA)

I Margaret Kiel-Morse hereby certify:
Name

That I am Information Services Librarian of the Arizona State
Title/Division

Library, Archives and Public Records of the State of Arizona;

That there is on file in said Agency the following:

Arizona Revised Statutes Annotated, 2015 Cumulative Pocket Part, containing A.R.S. § 49-424

The reproduction(s) to which this affidavit is attached is/are a true and correct copy of the document(s) on file.

Margaret A. Kiel-Morse
Signature

Subscribed and sworn to before me this 12-11-2015
Date

Signature, Notary Public

My commission expires 11-24-2017.
Date

M. DE LA HOYA
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 24, 2017

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ARIZONA
REVISED STATUTES

ANNOTATED

2015
Cumulative Pocket Part

For Use in 2015–2016

Volume 15C

Title 49

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m permit regulating the same activity at the

tion and except as required by 40 Code of
county may not regulate any person or activity
e section 1342(*l*), 40 Code of Federal Regula-
trative code 18-9-A902(G).

n ordinance, rule or regulation pursuant to this
ons prescribed in § 49-255.

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ith the county for use in administering the
lemented pursuant to this section.

, rule or regulation pursuant to this section, a
state a written statement including a summary
er regulation. The summary shall provide the
to contact with questions or comments. The
written statement in the next issue of the
ost to the county. The county shall make the
egulation available to the public at the same
e rule, ordinance or other regulation with the
ubsection. The county shall also comply with
on D, paragraphs 2, 3 and 4.

e, "county" means a county that operates a
stormwater system pursuant to 40 Code of

led by Laws 2009, Ch. 43, § 1.

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uthorize an administrative director for the
371 to perform enforcement duties. If the
a person is in violation of an ordinance, rule
-371 or a permit authorized pursuant to that
take actions consistent with this article and

B. A county that adopts ordinances, rules or regulations pursuant to § 49-371 may enforce those ordinances, rules or regulations as prescribed by §§ 49-261, 49-262 and 49-263 for violations of this article as if this article were referenced in §§ 49-261, 49-262 and 49-263 except for the following:

1. Appeals under § 49-261, subsection D shall be filed in the superior court.

2. Section 49-262, subsections F, G, H, I and J do not apply.

3. Any other section of statute prescribed in § 49-261, 49-262 or 49-263 does not apply.

C. The county's attorney and the county's designated administrative director have the authority prescribed for the attorney general and the director of environmental quality, respectively, pursuant to §§ 49-261, 49-262 and 49-263.

D. Notwithstanding §§ 49-262 and 49-263, penalties obtained pursuant to this article by a county shall be deposited into the county general fund.

E. A county shall not receive civil penalties under this section if an interested person, the United States, this state or another political subdivision or agency of this state has received civil penalties or is diligently prosecuting a civil penalty action in a court of the United States or this state, or in an administrative enforcement proceeding, with respect to the same allegations, standard, requirement or order. This state, and any political subdivision or agency of this state that is or may be affected by a civil, judicial or administrative action, may intervene as a matter of right in any pending civil, judicial or administrative action for purposes of obtaining injunctive or declaratory relief.

Added by Laws 2008, Ch. 192, § 2.

§§ 49-373, 49-374. Repealed by Laws 1998, Ch. 72, § 13, eff. August 21, 1998

Historical and Statutory Notes

The repealed sections, as well as former §§ 49-371 and 49-372, added by Laws 1989, Ch. 280, § 5, amended by Laws 1991, Ch. 161, §§ 1 to 5; Laws 1994, Ch. 95, § 7; Laws 1994, Ch. 128, §§ 4 to 7; Laws 1995, Ch. 88, §§ 6 to 8; Laws 1996, Ch. 252, § 5; Laws 1997, Ch. 130, §§ 14 to 25, related to wastewater facilities financing and the wastewater management authority.

Laws 1998, Ch. 72, § 16, provides:

"Sec. 16. Applicability

"The provisions of this act shall apply to all loan repayment agreements entered into before the effective date of this act."

CHAPTER 3

AIR QUALITY

ARTICLE 1. GENERAL PROVISIONS

Section	
49-401.01.	Definitions.
49-403.	General permits and individual permits; issuance; definition.
49-405.	Attainment area designations.
49-410.	Arizona emissions bank; program termination.
49-411.	Particulate measures; cities, towns, counties, departments; implementation; report.

ARTICLE 2. STATE AIR POLLUTION CONTROL

Section	
49-422.	Powers and duties.
49-424.	Duties of department.
49-427.	Grant or denial of applications; revisions.
49-456.	Technical assistance for small business; compliance advisory panel; panel termination.
49-457.	Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.

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Section
49-457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.
49-457.01. Leaf blower use restrictions and training; leaf blower equipment sellers; informational material; outreach; applicability.
49-457.02. Dust-free developments program; certification; seal.
49-457.03. Off-road vehicles; pollution advisory days; applicability; penalties.
49-457.04. Off-highway vehicle and all-terrain vehicle dealers; informational material; outreach; applicability.
49-457.05. Dust action general permit; best management practices; applicability; definitions.
49-459. State plan; carbon emissions from power plants.

ARTICLE 3. COUNTY AIR POLLUTION CONTROL

49-471.01. Regulatory bill of rights.
49-471.03. Inspections.
49-474.01. Additional board duties in vehicle emissions control areas; definitions.
49-474.05. Dust control; training; site coordinators.
49-474.06. Dust control; subcontractor registration; fee.
49-474.07. Voluntary diesel equipment retrofit program; criteria; inventory; permits.
49-476.01. Monitoring.
49-501. Unlawful open burning; exceptions; civil penalty; definition.

Section
ARTICLE 5. ANNUAL EMISSIONS INSPECTION OF MOTOR VEHICLES

49-541. Definitions.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.05. Alternative fuel vehicles.
49-543. Emissions inspection costs; disposition; fleet inspection; certificates.
49-545. Agreement with independent contractor; qualifications of contractor; agreement provisions.
49-546. Fleet emissions inspection stations; certificates of inspection; dealer's inventory; investigations; revocation or suspension of permit.
49-551. Air quality fee; air quality fund; purpose.
49-554. Technical assistance review.

ARTICLE 7. EMISSIONS CONTROL

49-573. Emissions controls; federal vehicles.

ARTICLE 1. GENERAL PROVISIONS

United States Supreme Court

Environmental regulation, Clean Air Act, preemption, state air quality rules requiring local fleet operators to purchase or lease vehicles meeting state motor vehicle pollution standards, see Engine Mfrs. Ass'n v. South Coast Air Quality Management Dist., 2004, 124 S.Ct. 1756, 541 U.S. 246, 158 L.Ed.2d 529, on remand 367 F.3d 1173.

§ 49-401.01. Definitions

In this chapter, unless the context otherwise requires:

1. "Administrator" means the administrator of the United States environmental protection agency.

2. "Adverse effects to human health" means those effects that result in or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, including adverse effects that are known to be or may reasonably be anticipated to be caused by substances that are acutely toxic, chronically toxic, carcinogenic, mutagenic, teratogenic, neurotoxic or causative of reproductive dysfunction.

3. "Adverse environmental effect" means any significant and widespread adverse effect that may reasonably be anticipated on wildlife, aquatic life, or other natural

resources, including adverse impacts or species or significant degradation of envi

4. "Arizona Grand Canyon visibility the following four mandatory federal cla of recommendations made by the Gra pursuant to the clean air act:

(a) Grand Canyon national park.

(b) Petrified Forest national park.

(c) Sycamore Canyon Wilderness.

(d) Mount Baldy Wilderness.

5. "Arizona mandatory federal class parks and wilderness areas that are de in this state pursuant to the clean air Canyon visibility transport commission

(a) Pine Mountain Wilderness.

(b) Mazatzal Wilderness.

(c) Sierra Ancha Wilderness.

(d) Superstition Wilderness.

(e) Saguaro Wilderness.

(f) Galiuro Wilderness.

(g) Chiricahua Wilderness.

(h) Chiricahua National Monument

6. "Attainment area" means any a regulations promulgated by the admin ambient air quality standards.

7. "Begin actual construction" me activities on an emissions unit which a change in method of operation, this ter preparatory activity, which mark the i

(a) For purposes of title I, parts C for purposes of applicants that requir the application of title I, parts C and activities include installation of buildi ground pipework and construction include any of the following, subject tc

(i) Clearing and grading, including and equipment, stripping and stockpil

(ii) Installation of access roads, dri

(iii) Installation of ancillary struc temporary storage structures, that a unit or associated air pollution contr

(iv) Ordering and on-site storage o

(b) For purposes other than for t this paragraph, these activities do n subsection D:

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2. Maintain an hourly plume report that includes meteorological conditions that affect dispersal of smoke.

3. In consultation with the department of health services and the on-scene coordinator, prepare a report that includes test results of any sampling, including the sampling rationale and protocol and chain of custody report using applicable environmental protection agency standards. The report shall also include, to the extent practicable, a smoke dispersion map with detail adequate to determine possible areas of impact at the level of detail practicable and a listing of likely releases of any chemical that is categorized by the United States environmental protection agency as a hazardous air pollutant and the corresponding environmental protection agency description of possible health effects of the chemical based on a reliable inventory of hazardous materials at the site or facility.

Added as § 36–1702 by Laws 1967, Ch. 2, § 9. Amended by Laws 1971, Ch. 190, § 11; Laws 1973, Ch. 158, § 198. Renumbered as § 49–422 by Laws 1986, Ch. 368, § 37, subsec. C, eff. July 1, 1987. Amended by Laws 1991, Ch. 283, § 4, eff. July 1, 1992; Laws 2000, Ch. 193, § 574; Laws 2000, Ch. 353, § 4, eff. July 18, 2000, retroactively effective to July 1, 2000; Laws 2007, Ch. 153, § 6; Laws 2011, Ch. 291, § 2.

[1] Section 41–1092 et seq.

Historical and Statutory Notes

Reviser's Notes:

2007 Note. Pursuant to authority of § 41–1304.02, in the section heading "and duties; definition" was added and subsection E, paragraph 4 was redesignated as subsection F.

§ 49–424. Duties of department

The department shall:

1. Determine whether the meteorology of the state is such that airsheds can be reasonably identified and air pollution, therefore, can be controlled by establishing air pollution control districts within well defined geographical areas.

2. Make continuing determinations of the quantity and nature of emissions of air contaminants, topography, wind and temperature conditions, possible chemical reactions in the atmosphere, the character of development of the various areas of the state, the economic effect of remedial measures on the various areas of the state, the availability, use and economic feasibility of air-cleaning devices, the effect on human health and danger to property from air contaminants, the effect on industrial operations of remedial measures and other matters necessary to arrive at a better understanding of air pollution and its control. In a county with a population in excess of one million two hundred thousand persons, the department shall locate a monitoring system in at least two remote geographic sites.

3. Establish substantive policy statements for identifying air quality exceptional events that take into consideration this state's unique geological, geographical and climatological conditions and any other unusual circumstances. These substantive policy statements shall be developed with the planning agency certified pursuant to § 49–406, subsection A and the county air pollution control department or district.

4. Determine the standards for the quality of the ambient air and the limits of air contaminants necessary to protect the public health, and to secure the comfortable enjoyment of life and property by the citizens of the state or in any defined geographical area of the state where the concentration of air pollution sources, the health of the population, or the nature of the economy or nature of land and its uses so require, and develop and transmit to the county boards of supervisors minimum state standards for air pollution control.

5. Conduct investigations, inspections a section under the procedures established by

6. Hold hearings relating to any aspec section, and in connection therewith, com production of records under the procedures

7. Prepare and develop a comprehensi control of air pollution in this state.

8. Encourage voluntary cooperation by affected groups or other states to achieve voluntary testing of actual or suspected sou

9. Encourage political subdivisions of t within their respective jurisdictions, and pr consultative assistance therefor.

10. Compile and publish from time t respect to those matters studied and invest

11. Develop and disseminate air qualit PM–10 nonattainment or maintenance are maintenance areas that are designated in 2011. Each forecast shall identify a low, for the next five consecutive days and s forecast is generated. At a minimum, department's website and distributed elec casts, the department shall consider all of

(a) Projected meteorological conditions nance area, including all of the following:

(i) Wind speed and direction.

(ii) Stagnation.

(iii) Recent precipitation.

(iv) Potential for precipitation.

(b) Existing concentrations of air pollut

(c) Historic air pollution concentrations logical conditions similar to those that

Added as § 36–1705 by Laws 1967, Ch. 2, § 9. 1970, Ch. 164, § 27, eff. May 18, 1970; Laws eff. Jan. 1, 1987. Renumbered as § 49–424 subsec. C, 77, eff. July 1, 1987. Amended by Ch. 1, § 22; Laws 1996, 7th S.S., Ch. 6, § 29; § 1.

§ 49–426. Permits; duties of direc tions; fees

Administrative

Air pollution control modifications; permits; permit revisions, see A.A.C. R18–2–1704.

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port that includes meteorological conditions that

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erials at the site or facility.

. 2, § 9. Amended by Laws 1971, Ch. 190, § 11; Laws
§ 49–422 by Laws 1986, Ch. 368, § 37, subsec. C, eff.
., Ch. 283, § 4, eff. July 1, 1992; Laws 2000, Ch. 193,
July 18, 2000, retroactively effective to July 1, 2000;
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it to the county boards of supervisors minimum
trol.

5. Conduct investigations, inspections and tests to carry out the duties of this section under the procedures established by this article.

6. Hold hearings relating to any aspect of or matter within the duties of this section, and in connection therewith, compel the attendance of witnesses and the production of records under the procedures established by § 49–432.

7. Prepare and develop a comprehensive plan or plans for the abatement and control of air pollution in this state.

8. Encourage voluntary cooperation by advising and consulting with persons or affected groups or other states to achieve the purposes of this chapter, including voluntary testing of actual or suspected sources of air pollution.

9. Encourage political subdivisions of the state to handle air pollution problems within their respective jurisdictions, and provide as it deems necessary technical and consultative assistance therefor.

10. Compile and publish from time to time reports, data and statistics with respect to those matters studied and investigated by the department.

11. Develop and disseminate air quality dust forecasts for the Maricopa county PM–10 nonattainment or maintenance area and any other PM–10 nonattainment or maintenance areas that are designated in this state from and after December 31, 2011. Each forecast shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. At a minimum, the forecasts shall be posted on the department's website and distributed electronically. When developing these forecasts, the department shall consider all of the following:

(a) Projected meteorological conditions for the PM–10 nonattainment or maintenance area, including all of the following:

(i) Wind speed and direction.

(ii) Stagnation.

(iii) Recent precipitation.

(iv) Potential for precipitation.

(b) Existing concentrations of air pollution at the time of the forecast.

(c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

Added as § 36–1705 by Laws 1967, Ch. 2, § 9. Amended by Laws 1969, Ch. 53, § 16; Laws 1970, Ch. 164, § 27, eff. May 18, 1970; Laws 1973, Ch. 158, § 200; Laws 1986, Ch. 319, § 1, eff. Jan. 1, 1987. Renumbered as § 49–424 and amended by Laws 1986, Ch. 368, §§ 37, subsec. C, 77, eff. July 1, 1987. Amended by Laws 1992, Ch. 299, § 10; Laws 1993, 6th S.S., Ch. 1, § 22; Laws 1996, 7th S.S., Ch. 6, § 29; Laws 2011, Ch. 214, § 1; Laws 2014, Ch. 86, § 1.

§ 49–426. Permits; duties of director; exceptions; applications; objections; fees

Administrative Code References

Air pollution control modifications; permits; permit revisions, see A.A.C. R18–2–1704.

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Exhibit G-II:

House Bill 2125, Amending A.R.S. § 49-424 (Fifty-first Legislature, Second Regular Session, 2014, Chapter 86) (reflecting changes from most recent approved version)

House Engrossed

State of Arizona
House of Representatives
Fifty-first Legislature
Second Regular Session
2014

CHAPTER 86

HOUSE BILL 2125

AN ACT

AMENDING SECTION 49-424, ARIZONA REVISED STATUTES; RELATING TO AIR QUALITY.

(TEXT OF BILL BEGINS ON NEXT PAGE)

Be it enacted by the Legislature of the State of Arizona:

Section 1. Section 49-424, Arizona Revised Statutes, is amended to read:

49-424. Duties of department

The department shall:

1. Determine whether the meteorology of the state is such that airsheds can be reasonably identified and air pollution, therefore, can be controlled by establishing air pollution control districts within well defined geographical areas.

2. Make continuing determinations of the quantity and nature of emissions of air contaminants, topography, wind and temperature conditions, possible chemical reactions in the atmosphere, the character of development of the various areas of the state, the economic effect of remedial measures on the various areas of the state, the availability, use and economic feasibility of air-cleaning devices, the effect on human health and danger to property from air contaminants, the effect on industrial operations of remedial measures and other matters necessary to arrive at a better understanding of air pollution and its control. In a county with a population in excess of one million two hundred thousand persons ~~according to the most recent United States decennial census~~, the department shall locate a monitoring system in at least two remote geographic sites.

3. Establish substantive policy statements for identifying air quality exceptional events that take into consideration this state's unique geological, geographical and climatological conditions and any other unusual circumstances. These substantive policy statements shall be developed with the planning agency certified pursuant to section 49-406, subsection A and the county air pollution control department or district.

4. Determine the standards for the quality of the ambient air and the limits of air contaminants necessary to protect the public health, and to secure the comfortable enjoyment of life and property by the citizens of the state or in any defined geographical area of the state where the concentration of air pollution sources, the health of the population, or the nature of the economy or nature of land and its uses so require, and develop and transmit to the county boards of supervisors minimum state standards for air pollution control.

5. Conduct investigations, inspections and tests to carry out the duties of this section under the procedures established by this article.

6. Hold hearings relating to any aspect of or matter within the duties of this section, and in connection therewith, compel the attendance of witnesses and the production of records under the procedures established by section 49-432.

7. Prepare and develop a comprehensive plan or plans for the abatement and control of air pollution in this state.

8. Encourage voluntary cooperation by advising and consulting with persons or affected groups or other states to achieve the purposes of this

chapter, including voluntary testing of actual or suspected sources of air pollution.

9. Encourage political subdivisions of the state to handle air pollution problems within their respective jurisdictions, and provide as it deems necessary technical and consultative assistance therefor.

10. Compile and publish from time to time reports, data and statistics with respect to those matters studied and investigated by the department.

11. Develop and disseminate air quality dust forecasts for the Maricopa county PM-10 nonattainment OR MAINTENANCE area AND ANY OTHER PM-10 NONATTAINMENT OR MAINTENANCE AREAS THAT ARE DESIGNATED IN THIS STATE FROM AND AFTER DECEMBER 31, 2011. Each forecast shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. At a minimum, the forecasts shall be posted on the department's website and distributed electronically. When developing these forecasts, the department shall consider all of the following:

(a) Projected meteorological conditions for the ~~Maricopa county~~ PM-10 NONATTAINMENT OR MAINTENANCE area, including all of the following:

(i) Wind speed and direction.

(ii) Stagnation.

(iii) Recent precipitation.

(iv) Potential for precipitation.

(b) Existing concentrations of air pollution at the time of the forecast.

(c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

APPROVED BY THE GOVERNOR APRIL 17, 2014.

FILED IN THE OFFICE OF THE SECRETARY OF STATE APRIL 18, 2014.

Exhibit G-III:

History of A.R.S. § 49-457: House Bill 2394, Amending A.R.S. § 49-457 (Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1); A.R.S. § 49-457 (2011); A.R.S. § 49-457 (2005)

House Bill 2394, Amending A.R.S. § 49-457 (Fifty-second Legislature, First Regular Session, 2015,Chapter 243, § 1)

2015 No. 4

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ARIZONA

LEGISLATIVE SERVICE 2015

FIFTY-SECOND LEGISLATURE
First Regular Session
Chapters 221 to 324 (End)

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THOMSON
REUTERS

Westlaw Legislative Database: AZ–LEGIS
See Preface for further information

receive a public report from the seller or lessor pursuant to section 32–2183, subsection I.

Approved by the Governor, April 9, 2015.

Filed in the Office of the Secretary of State, April 10, 2015.

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AIR POLLUTION
CHAPTER 243

H.B. 2394

AN ACT AMENDING SECTION 49–457, ARIZONA REVISED STATUTES; RELATING TO AIR QUALITY.

Be it enacted by the Legislature of the State of Arizona:

Section 1. Section 49–457, Arizona Revised Statutes, is amended to read:

§ 49–457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.

2. The director of the Arizona department of agriculture or the director's designee.

3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

11. One person actively engaged in the operation of a beef cattle feed lot.

12. One person actively engaged in the operation of a dairy.

13. One person actively engaged in the operation of a poultry facility.

14. One person actively engaged in the operation of a swine facility.

15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 15 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to title 38, chapter 4, article 2.

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and

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provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. A person who commences a regulated agricultural activity ~~after December 31, 2000~~ shall immediately comply with the agricultural general permit ~~within eighteen months of commencing the activity~~ prescribed by this section.

H. The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM–10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to section 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM–10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM–10 particulate matter, to demonstrate compliance with applicable provisions of the general permit. Best management practices may vary within the regulated area, according to regional or geographical conditions or cropping patterns.

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and require that the person obtain an individual permit pursuant to section 49–426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other applicable requirements of the clean air act, including section 110(l) of the act (42 United States Code section 7410(l)).

O. The regulation of PM–10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts fur-

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ther regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.

P. For the purposes of this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce PM–10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce PM–10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce PM–10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

(d) ~~Reduces~~ Reduce PM–10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.

(e) Reduce PM–10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:

(i) Unpaved access connections.

(ii) Unpaved roads or feed lanes.

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19 and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Sec. 2. Effective date

Section 49–457, Arizona Revised Statutes, as amended by this act, is effective from and after December 31, 2015.

Approved by the Governor, April 9, 2015.

Filed in the Office of the Secretary of State, April 10, 2015.

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WEIGHTS AND MEASURES

CHAPTER 244

H.B. 2480

AN ACT AMENDING TITLE 3, ARIZONA REVISED STATUTES, BY ADDING CHAPTER 19; PROVIDING FOR TRANSFERRING AND RENUMBERING; AMENDING SECTION 3–102, ARIZONA REVISED STATUTES; AMENDING SECTIONS 3–3401, 3–3413, 3–3414, 3–3418, 3–3431, 3–3433, 3–3434, 3–3451, 3–3453, 3–3454, 3–3471, 3–3472, 3–3473, 3–3475, 3–3492, 3–3493, 3–3494, 3–3495, 3–3496, 3–3512, 3–3513 AND 3–3515, ARIZONA REVISED STATUTES, AS TRANSFERRED AND RENUMBERED; AMENDING SECTIONS 9–499.18, 28–364, 28–5602, 28–5605 AND 28–5936, ARIZONA REVISED STATUTES; AMENDING TITLE 28, ARIZONA REVISED STATUTES, BY ADDING CHAPTER 30; AMENDING TITLE 28, CHAPTER 30, ARIZONA REVISED STATUTES, BY ADDING ARTICLE 2; AMENDING SECTION 41–112, ARIZONA REVISED STATUTES; REPEALING SECTIONS 41–2052, 41–2061 AND 41–3021.02, ARIZONA REVISED STATUTES; RELATING TO WEIGHTS AND MEASURES.

Be it enacted by the Legislature of the State of Arizona:

Section 1. Title 3, Arizona Revised Statutes, is amended by adding chapter 19, to read:

CHAPTER 19

WEIGHTS AND MEASURES SERVICES DIVISION

ARTICLE 1. GENERAL PROVISIONS

ARTICLE 2. STATE ADMINISTRATION OF WEIGHTS AND MEASURES

ARTICLE 3. METHOD OF SALE OF COMMODITIES AND SERVICES

ARTICLE 4. LICENSING, TESTING AND CERTIFICATION

ARTICLE 5. REGULATION

ARTICLE 6. MOTOR FUEL

ARTICLE 7. GASOLINE VAPOR CONTROL

Sec. 2. Transfer and renumber

Title 41, chapter 15, Arizona Revised Statutes, is transferred and renumbered for placement in title 3, Arizona Revised Statutes, as added by this act, as chapter 19. Title 41, chapter 15, articles 1, 2, 3, 4, 5, 6 and 7, Arizona Revised Statutes, are transferred and renumbered for placement in title 3, chapter 19, Arizona Revised Statutes, as added by this act, as articles 1, 2, 3, 4, 5, 6 and 7, respectively. The following section is transferred and renumbered for placement in title 3, chapter 19, article 1:

A.R.S. § 49-457 (2011) Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions (excluding 2015 revisions)

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Volume 15C

Title 49

Including Legislation Enacted Through The First Regular Session and
The Third Special Session of The Fiftieth Legislature (2011)

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unless the applicant has corrected the reasons for the objections specified by the director as reasons for such denial.

Added as § 36–1707.02 by Laws 1970, Ch. 164, § 31, eff. May 18, 1970. Amended by Laws 1973, Ch. 158, § 203. Renumbered as § 49–427 and amended by Laws 1986, Ch. 368, § 2, subsec. C, 80, eff. July 1, 1987. Amended by Laws 1990, Ch. 42, § 8; Laws 1992, Ch. 2, § 17, eff. Sept. 1, 1993; Laws 2010, Ch. 315, § 3.

Historical and Statutory Notes

Laws 2010, Ch. 315, § 4, provides:

"Sec. 4. Conditional enactment; revisions to state implementation plan; notice

"A. Sections 49–401.01 and 49–427, Arizona Revised Statutes, as amended by this act, are not effective unless on or before October 1, 2013 the United States environmental protection agency approves revisions to this state's air quality implementation plan that incorporate the changes made by this act.

"B. The director of the department of environmental quality shall promptly provide written notice of the date of that approval or the failure to receive that approval to the director of the Arizona legislative council.

§ 49–457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.

2. The director of the Arizona department of agriculture or the director's designee.

3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

11. One person actively engaged in the operation of a beef cattle feed lot.

12. One person actively engaged in the operation of a dairy.

13. One person actively engaged in the operation of a poultry facility.

14. One person actively engaged in the operation of a swine facility.

15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 15 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to title 38, chapter 4, article 2.[1]

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D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. A person who commences a regulated agricultural activity after December 31, 2000 shall comply with the general permit within eighteen months of commencing the activity.

H. The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM–10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to § 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM–10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM–10 particulate matter, to demonstrate compliance with applicable provisions of the general permit. Best management practices may vary within the regulated area, according to regional or geographical conditions or cropping patterns.

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.[2] The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and require that the person obtain an individual permit pursuant to § 49–426. A revocation becomes effective after the director has provided the

person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other applicable requirements of the clean air act, including section 110(*l*) of the act (42 United States Code section 7410(*l*)).

O. The regulation of PM–10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts further regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.

P. For the purposes of this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce PM–10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce PM–10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce PM–10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

(d) Reduces PM–10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.

(e) Reduce PM–10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:

(i) Unpaved access connections.

(ii) Unpaved roads or feed lanes.

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19[3] and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

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3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Added by Laws 1998, Ch. 217, § 16. Amended by Laws 2007, Ch. 292, § 14; Laws 2009, Ch. 180, § 1; Laws 2010, Ch. 82, § 1; Laws 2010, Ch. 207, § 1; Laws 2011, Ch. 214, § 2.

[1] Section 38–621 et seq.
[2] Section 41–1092 et seq.
[3] Section 48–2901 et seq.

Historical and Statutory Notes

Laws 2007, Ch. 292, § 20, provides:

"Sec. 20. **Interim rule making; publication**

"Notwithstanding title 41, chapter 6, article 3, Arizona Revised Statutes, the best management practices committee for regulated agricultural activities established under § 49–457, Arizona Revised Statutes, shall adopt the rules required by § 49–457, Arizona Revised Statutes, as amended by this act, as interim rules with an immediate effective date in compliance with § 41–1032, Arizona Revised Statutes, in order to comply with the December 31, 2007 deadline imposed by the United States environmental protection agency for failure to attain the national ambient air quality standard for PM–10 on or before December 31, 2006. The rules shall have an immediate effective date. Interim rules are exempt from title 41, chapter 6, article 3, Arizona Revised Statutes, except that the committee shall submit the rules for publication and the secretary of state shall publish the rules in the Arizona administrative register."

Laws 2007, Ch. 292, § 21, relating to public contracts and dust control requirements, was repealed by § 22 of that act effective October 1, 2009."

Laws 2009, Ch. 180, §§ 2 and 3, provide:

"Sec. 2. **Rule making; compliance**

"A. On or before June 30, 2010, the agricultural best management practices committee established by § 49–457, Arizona Revised Statutes, as amended by this act, shall adopt by rule an agricultural general permit that specifies best management practices for regulated agricultural activities to reduce PM–10 particulate emissions from dairy operations, beef cattle feed lot operations, poultry facility operations and swine facility operations.

"B. A person who engages in regulated agricultural activity from a dairy, a beef cattle feed lot, a poultry facility or a swine facility shall comply with the general permit within six months after the effective date of the general permit.

"Sec. 3. **New PM–10 particulate nonattainment areas; best management practices; retroactivity**

"A. Notwithstanding any other statute, a rule or ordinance that is adopted after June

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ARIZONA REVISED STATUTES

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4. Have staff from the small business stationary source technical and environmental compliance assistance program to develop and disseminate reports and advisory opinions.

Added by Laws 1992, Ch. 299, § 33.

[1] 20 U.S.C.A. § 1221.
[2] 5 U.S.C.A. § 601.
[3] 5 U.S.C.A. § 504.

Historical and Statutory Notes

Laws 1992, Ch. 299, § 63, provides:

"Sec. 63. Initial terms of members of compliance advisory panel

"Notwithstanding § 49–456, Arizona Revised Statutes, as added by this act, the initial terms of members of the compliance advisory panel are:

"1. The appointee of the director of the department of environmental quality shall serve a term ending January 1, 1994.

"2. The appointees of the governor shall serve two terms ending January 1, 1995.

"3. The appointees of the speaker of the house of representatives shall serve two terms ending January 1, 1996.

"4. The appointees of the president of the senate shall serve two terms ending January 1, 1997."

For conditional enactment provision of Laws 1992, Ch. 299, and occurrence of the condition, see Historical and Statutory Notes following § 49–401.01.

Section 41–3003.12, terminating the compliance advisory council on July 1, 2003, and repealing § 49–456 on January 1, 2004, was repealed by Laws 2000, Ch. 56, § 1.

Library References

Environmental Law ⟹268, 290.
Westlaw Topic No. 149E.

§ 49–457. Agricultural best management practices committee; members; powers; permits; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director or the director's designee.

2. The director of the department of agriculture or the director's designee.

3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

C. The governor shall appoint the members designated pursuant to subsection A,[1] paragraphs 5 through 10 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to § 38–611, subsection D.

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. Notwithstanding subsections I, J and K of this section, a person engaged in a regulated agricultural activity on the effective date of this section shall comply with the general permit as provided in subsection H of this section by December 31, 2001. A person who commences a regulated agricultural activity after December 31, 2000, shall comply with the general permit within eighteen months of commencing the activity.

H. By June 10, 2000, the committee shall adopt, by rule, an agricultural general permit specifying best management practices for regulated agricultural activities to reduce pm-10 particulate emissions. A person subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to § 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used to demonstrate compliance with applicable provisions of the general permit no later than December 31, 2001. Best management practices may vary within the Maricopa pm-10 particulate nonattainment area according to regional or geographical conditions or cropping patterns. The director shall submit the rule to the United States environmental protection agency as a revision to the applicable implementation plan within sixty days of adoption.

I. If the director determines that a person engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve upon the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.[2] The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than six months, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule

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pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve upon the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than six months, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and to require that the person obtain an individual permit pursuant to § 49–426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program by June 10, 2000. The education program shall be conducted by the director or the director's designee or designees.

N. In this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce pm-10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce pm-10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce pm-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

2. "Applicable implementation plan" means that term as defined in 42 United States Code 7601(q).[3]

3. "Best management practices" means techniques verified by scientific research, that on a case by case basis are practical, economically feasible and effective in reducing pm-10 particulate emissions from a regulated agricultural activity.

4. "Maricopa pm-10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 code of Federal Regulations part 81.303.

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5. "Regulated agricultural activities" means commercial farming practices that may produce pm-10 particulate emissions within the maricopa pm-10 particulate nonattainment area.

Added by Laws 1998, Ch. 217, § 16.

[1] So in original. Should be "subsection B".

[2] Section 41–1092 et seq.

[3] 42 U.S.C.A. 7601(q).

Historical and Statutory Notes

Reviser's Notes:

1998 Note. Pursuant to authority of § 41–1304.02, in subsection G, first sentence "section" was substituted for "act" and in subsection N the definitions were alphabetized with paragraph 5 renumbered as paragraph 2 and paragraphs 2, 3 and 4 renumbered as paragraphs 3, 4 and 5, respectively.

Administrative Code References

Agricultural PM10 general permit, Maricopa PM10 nonattainment area, see A.A.

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Library References

Environmental Law ⟹290.
Westlaw Topic No. 149E.

Notes of Decisions

Validity 1

1. Validity

Environmental Protection Agency's (EPA) approval of Arizona's general permit rule for agricultural emissions of airborne particulate matter of diameter 10 micrometers or less (PM—10) as best available control measures (BACM) was not arbitrary and capricious under Clean Air Act (CAA), taking into account uncertainties involved in prescribing agricultural rules, measures that Arizona adopted, and process by which Arizona arrived at its best management practices (BMPs); Arizona offered reasoned explanation for choices it made, and EPA was within bounds of its judgment and expertise to approve it. Vigil v. Leavitt, C.A.92004, 2004 WL 1043373. Environmental Law ⟹ 277

§ 49–458. Regional haze program; authority

The department may participate in interstate regional haze programs that are established by the regional planning organization that is authorized for this region pursuant to 40 code of federal regulations part 51, subpart P and the clean air act.

Added as § 49–411 by Laws 2002, Ch. 251, § 2. Renumbered as § 49–414. Renumbered as § 49–458 by Laws 2004, Ch. 129, § 1.

Historical and Statutory Notes

Laws 2004, Ch. 129, § 1, provides:

"**Section 1. Transfer and renumber**"

"Sections 49–414 and 49–414.01, Arizona Revised Statutes, are transferred and renumbered for placement in title 49, chapter 3, article 2, Arizona Revised Statutes, as §§ 49–458 and 49–458.01, respectively."

Reviser's Notes:

2002 Note. Pursuant to authority of § 41–1304.02, this section, added by Laws 2002, Ch. 251, sec. 2 as § 49–411, was renumbered as § 49–414.

Exhibit G-IV:

Certified A.R.S. § 49-457 Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions (2015) (effective January 1, 2016)

(last amended by House Bill 2394, Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1)

STATE OF ARIZONA)
) ss:
COUNTY OF MARICOPA)

I Margaret Kiel-Morse hereby certify:
Name

That I am Information Services Librarian of the Arizona State
Title/Division

Library, Archives and Public Records of the State of Arizona;

That there is on file in said Agency the following:

Arizona Revised Statutes Annotated, 2015 Cumulative Pocket Part, containing A.R.S. §49-457, effective January 1, 2016

The reproduction(s) to which this affidavit is attached is/are a true and correct copy of the document(s) on file.

Signature

Subscribed and sworn to before me this 12-11-2015
Date

Signature, Notary Public

My commission expires 11-24-2017.
Date

M. DE LA HOYA
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 24, 2017

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ARIZONA
REVISED STATUTES

ANNOTATED

2015
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For Use in 2015–2016

Volume 15C

Title 49

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ated small municipal separate storm sewer charge elimination system stormwater manage- plication of any ordinance, rule or regulation as

ed in 40 Code of Federal Regulations section quirements of 40 Code of Federal Regulations

quirements of public education and outreach, as provided by the clean water act.

ion and except as required by the clean water rmit from any person with a federal or state em permit regulating the same activity at the

tion and except as required by 40 Code of county may not regulate any person or activity e section 1342(*l*), 40 Code of Federal Regula- trative code 18-9-A902(G).

n ordinance, rule or regulation pursuant to this ons prescribed in § 49-255.

uant to an ordinance or rule adopted pursuant ith the county for use in administering the lemented pursuant to this section.

, rule or regulation pursuant to this section, a state a written statement including a summary er regulation. The summary shall provide the to contact with questions or comments. The written statement in the next issue of the cost to the county. The county shall make the egulation available to the public at the same e rule, ordinance or other regulation with the ubsection. The county shall also comply with on D, paragraphs 2, 3 and 4.

e, "county" means a county that operates a tormwater system pursuant to 40 Code of

led by Laws 2009, Ch. 43, § 1.

d Statutory Notes

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r; enforcement

uthorize an administrative director for the 371 to perform enforcement duties. If the a person is in violation of an ordinance, rule -371 or a permit authorized pursuant to that take actions consistent with this article and

B. A county that adopts ordinances, rules or regulations pursuant to § 49-371 may enforce those ordinances, rules or regulations as prescribed by §§ 49-261, 49-262 and 49-263 for violations of this article as if this article were referenced in §§ 49-261, 49-262 and 49-263 except for the following:

1. Appeals under § 49-261, subsection D shall be filed in the superior court.

2. Section 49-262, subsections F, G, H, I and J do not apply.

3. Any other section of statute prescribed in § 49-261, 49-262 or 49-263 does not apply.

C. The county's attorney and the county's designated administrative director have the authority prescribed for the attorney general and the director of environmental quality, respectively, pursuant to §§ 49-261, 49-262 and 49-263.

D. Notwithstanding §§ 49-262 and 49-263, penalties obtained pursuant to this article by a county shall be deposited into the county general fund.

E. A county shall not receive civil penalties under this section if an interested person, the United States, this state or another political subdivision or agency of this state has received civil penalties or is diligently prosecuting a civil penalty action in a court of the United States or this state, or in an administrative enforcement proceeding, with respect to the same allegations, standard, requirement or order. This state, and any political subdivision or agency of this state that is or may be affected by a civil, judicial or administrative action, may intervene as a matter of right in any pending civil, judicial or administrative action for purposes of obtaining injunctive or declaratory relief.

Added by Laws 2008, Ch. 192, § 2.

§§ 49-373, 49-374. Repealed by Laws 1998, Ch. 72, § 13, eff. August 21, 1998

Historical and Statutory Notes

The repealed sections, as well as former §§ 49-371 and 49-372, added by Laws 1989, Ch. 280, § 5, amended by Laws 1991, Ch. 161, §§ 1 to 5; Laws 1994, Ch. 95, § 7; Laws 1994, Ch. 128, §§ 4 to 7; Laws 1995, Ch. 88, §§ 6 to 8; Laws 1996, Ch. 252, § 5; Laws 1997, Ch. 130, §§ 14 to 25, related to wastewater facilities financing and the wastewater management authority.

Laws 1998, Ch. 72, § 16, provides:

"Sec. 16. Applicability

"The provisions of this act shall apply to all loan repayment agreements entered into before the effective date of this act."

CHAPTER 3

AIR QUALITY

ARTICLE 1. GENERAL PROVISIONS

Section	
49-401.01.	Definitions.
49-403.	General permits and individual permits; issuance; definition.
49-405.	Attainment area designations.
49-410.	Arizona emissions bank; program termination.
49-411.	Particulate measures; cities, towns, counties, departments; implementation; report.

ARTICLE 2. STATE AIR POLLUTION CONTROL

Section	
49-422.	Powers and duties.
49-424.	Duties of department.
49-427.	Grant or denial of applications; revisions.
49-456.	Technical assistance for small business; compliance advisory panel; panel termination.
49-457.	Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.

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Section
49-457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions.
49-457.01. Leaf blower use restrictions and training; leaf blower equipment sellers; informational material; outreach; applicability.
49-457.02. Dust-free developments program; certification; seal.
49-457.03. Off-road vehicles; pollution advisory days; applicability; penalties.
49-457.04. Off-highway vehicle and all-terrain vehicle dealers; informational material; outreach; applicability.
49-457.05. Dust action general permit; best management practices; applicability; definitions.
49-459. State plan; carbon emissions from power plants.

ARTICLE 3. COUNTY AIR POLLUTION CONTROL

49-471.01. Regulatory bill of rights.
49-471.03. Inspections.
49-474.01. Additional board duties in vehicle emissions control areas; definitions.
49-474.05. Dust control; training; site coordinators.
49-474.06. Dust control; subcontractor registration; fee.
49-474.07. Voluntary diesel equipment retrofit program; criteria; inventory; permits.
49-476.01. Monitoring.
49-501. Unlawful open burning; exceptions; civil penalty; definition.

Section
ARTICLE 5. ANNUAL EMISSIONS INSPECTION OF MOTOR VEHICLES

49-541. Definitions.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.03. Motor vehicle dealer; emissions testing; remedies; definition.
49-542.05. Alternative fuel vehicles.
49-543. Emissions inspection costs; disposition; fleet inspection; certificates.
49-545. Agreement with independent contractor; qualifications of contractor; agreement provisions.
49-546. Fleet emissions inspection stations; certificates of inspection; dealer's inventory; investigations; revocation or suspension of permit.
49-551. Air quality fee; air quality fund; purpose.
49-554. Technical assistance review.

ARTICLE 7. EMISSIONS CONTROL

49-573. Emissions controls; federal vehicles.

ARTICLE 1. GENERAL PROVISIONS

United States Supreme Court

Environmental regulation, Clean Air Act, preemption, state air quality rules requiring local fleet operators to purchase or lease vehicles meeting state motor vehicle pollution standards, see Engine Mfrs. Ass'n v. South Coast Air Quality Management Dist., 2004, 124 S.Ct. 1756, 541 U.S. 246, 158 L.Ed.2d 529, on remand 367 F.3d 1173.

§ 49-401.01. Definitions

In this chapter, unless the context otherwise requires:

1. "Administrator" means the administrator of the United States environmental protection agency.

2. "Adverse effects to human health" means those effects that result in or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, including adverse effects that are known to be or may reasonably be anticipated to be caused by substances that are acutely toxic, chronically toxic, carcinogenic, mutagenic, teratogenic, neurotoxic or causative of reproductive dysfunction.

3. "Adverse environmental effect" means any significant and widespread adverse effect that may reasonably be anticipated on wildlife, aquatic life, or other natural

resources, including adverse impacts or species or significant degradation of envi

4. "Arizona Grand Canyon visibility the following four mandatory federal cla of recommendations made by the Gra pursuant to the clean air act:

(a) Grand Canyon national park.

(b) Petrified Forest national park.

(c) Sycamore Canyon Wilderness.

(d) Mount Baldy Wilderness.

5. "Arizona mandatory federal class parks and wilderness areas that are de in this state pursuant to the clean air Canyon visibility transport commission

(a) Pine Mountain Wilderness.

(b) Mazatzal Wilderness.

(c) Sierra Ancha Wilderness.

(d) Superstition Wilderness.

(e) Saguaro Wilderness.

(f) Galiuro Wilderness.

(g) Chiricahua Wilderness.

(h) Chiricahua National Monument

6. "Attainment area" means any a regulations promulgated by the admin ambient air quality standards.

7. "Begin actual construction" me activities on an emissions unit which a change in method of operation, this ter preparatory activity, which mark the i

(a) For purposes of title I, parts C for purposes of applicants that requir the application of title I, parts C and activities include installation of buildi ground pipework and construction include any of the following, subject tc

(i) Clearing and grading, including and equipment, stripping and stockpil

(ii) Installation of access roads, dri

(iii) Installation of ancillary struc temporary storage structures, that a unit or associated air pollution contr

(iv) Ordering and on-site storage o

(b) For purposes other than for t this paragraph, these activities do n subsection D:

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person who is engaged in a regulated activity
eral permit, and that person has previously
tion I of this section, the director may serve on
r requiring compliance with the general permit
portunity for a hearing pursuant to title 41,
ll state with reasonable particularity the nature
ty that the person has a period that the director
less than sixty days, to submit a plan to the
anagement practices from among those adopted
this section that the person will use to comply

th the plan submitted pursuant to subsection J
voke the agricultural general permit for that
on obtain an individual permit pursuant to
effective after the director has provided the
y for a hearing pursuant to title 41, chapter 6,

lly reexamine, evaluate and modify best man-
nodifications shall be submitted to the United
icy as a revision to the applicable implementa-

and commence an education program. The
l by the director or the director's designee or

dopted pursuant to this section does not affect
applicable implementation plan or any other
air act, including section 110(*l*) of the act (42

culate emissions produced by regulated agri-
atewide concern. Accordingly, this section
ated agricultural activities by a county, city,
is state.

, unless the context otherwise requires:

eans best management practices that:

sions from tillage practices and from harvest-

sions from those areas of a commercial farm
n.

sions from those areas of a commercial farm
ncluding prior to plant emergence and when

sions from those areas of a commercial farm
hmoving activities.

sions from the activities of a dairy, a beef
ine facility, including practices relating to the

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19[3] and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Added by Laws 1998, Ch. 217, § 16. Amended by Laws 2007, Ch. 292, § 14; Laws 2009, Ch. 180, § 1; Laws 2010, Ch. 82, § 1; Laws 2010, Ch. 207, § 1; Laws 2011, Ch. 214, § 2.

[1] Section 38–621 et seq.
[2] Section 41–1092 et seq.
[3] Section 48–2901 et seq.

§ 49–457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

Section effective Jan. 1, 2016. See, also, section effective until Jan. 1, 2016.

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.

2. The director of the Arizona department of agriculture or the director's designee.

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3. The dean of the college of agriculture of the university of Arizona or the dean's designee.

4. The state director of the United States natural resources conservation service or the director's designee.

5. One person actively engaged in the production of citrus.

6. One person actively engaged in the production of vegetables.

7. One person actively engaged in the production of cotton.

8. One person actively engaged in the production of alfalfa.

9. One person actively engaged in the production of grain.

10. One soil taxonomist from the university of Arizona college of agriculture.

11. One person actively engaged in the operation of a beef cattle feed lot.

12. One person actively engaged in the operation of a dairy.

13. One person actively engaged in the operation of a poultry facility.

14. One person actively engaged in the operation of a swine facility.

15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 15 of this section for a term of six years. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to title 38, chapter 4, article 2.[1]

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. A person who commences a regulated agricultural activity shall immediately comply with the agricultural general permit prescribed by this section.

H. The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM–10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to § 49–426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM–10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM–10 particulate matter, to demonstrate compliance with applicable provisions of the general permit. Best management practices may vary within the regulated area, according to regional or geographical conditions or cropping patterns.

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve on the person by certified mail an order requiring compliance with the general

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permit and notifying the person of the oppor
chapter 6, article 10.[2] The order shall state
of the noncompliance and shall specify that t
determines is reasonable, but is not less th
supervisors of the natural resource cons
engages in the regulated activity that specif
among those adopted in rule pursuant to sub
will use to comply with the general permit.

J. If the director determines that a pers
is not in compliance with the general p
submitted a plan pursuant to subsection I o
the person by certified mail an order requi
and notifying the person of the opportun
chapter 6, article 10. The order shall state
of the noncompliance and shall specify that
determines is reasonable, but is not less t
department that specifies the best managen
in rule pursuant to subsection H of this se
with the general permit.

K. If a person fails to comply with the
of this section, the director may revoke
person and require that the person ob
§ 49–426. A revocation becomes effecti
person with notice and an opportunity for
article 10.

L. The committee may periodically re
agement practices. Any approved modifi
States environmental protection agency as
tion plan.

M. The committee shall develop and
education program shall be conducted by
designees.

N. A best management practice adopt
any applicable requirements in an appli
applicable requirements of the clean air
United States Code section 7410(*l*)).

O. The regulation of PM–10 particula
cultural activities is a matter of state
preempts further regulation of regulate
town or other political subdivision of this

P. For the purposes of this section, u

1. "Agricultural general permit" mea

(a) Reduce PM–10 particulate emissio
ing on a commercial farm.

(b) Reduce PM–10 particulate emissio
that are not normally in crop production.

(c) Reduce PM–10 particulate emissio
that are normally in crop production in
the land is not in crop production.

iculture of the university of Arizona or the

d States natural resources conservation service

the production of citrus.

the production of vegetables.

the production of cotton.

the production of alfalfa.

the production of grain.

niversity of Arizona college of agriculture.

1 the operation of a beef cattle feed lot.

1 the operation of a dairy.

1 the operation of a poultry facility.

1 the operation of a swine facility.

y a county air quality department or agency.

members designated pursuant to subsection ction for a term of six years. Members may ntitled to compensation for their services but of expenses pursuant to title 38, chapter 4,

irman from the appointed members to serve a

e call of the chairman or at the request of a

al quality, the Arizona department of agricul- he university of Arizona shall cooperate with any necessary information to the committee. lity shall provide the necessary staff support

ulated agricultural activity shall immediately rmit prescribed by this section.

ule, an agricultural general permit specifying record keeping and reporting requirements, o reduce PM-10 particulate emissions. A al general permit pursuant to this section is to § 49-426 except as provided in subsection ll adopt by rule a list of best management be used in areas designated as moderate atter and at least two of which shall be used ainment for PM-10 particulate matter, to le provisions of the general permit. Best the regulated area, according to regional or erns.

person who is engaged in a regulated activity permit, and that person has not previously ed pursuant to this section, the director may order requiring compliance with the general

permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.[2] The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and require that the person obtain an individual permit pursuant to § 49-426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other applicable requirements of the clean air act, including section 110(*l*) of the act (42 United States Code section 7410(*l*)).

O. The regulation of PM-10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts further regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.

P. For the purposes of this section, unless the context otherwise requires:

1. "Agricultural general permit" means best management practices that:

(a) Reduce PM-10 particulate emissions from tillage practices and from harvesting on a commercial farm.

(b) Reduce PM-10 particulate emissions from those areas of a commercial farm that are not normally in crop production.

(c) Reduce PM-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

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(d) Reduce PM–10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.

(e) Reduce PM–10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:

(i) Unpaved access connections.

(ii) Unpaved roads or feed lanes.

(iii) Animal waste handling and transporting.

(iv) Arenas, corrals and pens.

(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM–10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19[3] and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:

(i) Unpaved operation and maintenance roads.

(ii) Canals.

(iii) Unpaved utility access roads.

2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).

3. "Best management practices" means techniques that are verified by scientific research and that on a case by case basis are practical, economically feasible and effective in reducing PM–10 particulate emissions from a regulated agricultural activity.

4. "Maricopa PM–10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.

5. "Regulated agricultural activities" means:

(a) Commercial farming practices that may produce PM–10 particulate emissions within the regulated area, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.

(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.

6. "Regulated area" means any of the following:

(a) The Maricopa PM–10 particulate nonattainment area.

(b) Any portion of area A that is located in a county with a population of two million or more persons.

(c) Any other PM–10 particulate nonattainment area established in this state on or after June 1, 2009.

Added by Laws 1998, Ch. 217, § 16. Amended by Laws 2007, Ch. 292, § 14; Laws 2009, Ch. 180, § 1; Laws 2010, Ch. 82, § 1; Laws 2010, Ch. 207, § 1; Laws 2011, Ch. 214, § 2; Laws 2015, Ch. 243, § 1, eff. Jan. 1, 2016.

[1] Section 38–621 et seq.
[2] Section 41–1092 et seq.
[3] Section 48–2901 et seq.

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Historical and

Laws 2007, Ch. 292, § 20, provides:

"**Sec. 20. Interim rule making; publication**

"Notwithstanding title 41, chapter 6, article 3, Arizona Revised Statutes, the best management practices committee for regulated agricultural activities established under § 49–457, Arizona Revised Statutes, shall adopt the rules required by § 49–457, Arizona Revised Statutes, as amended by this act, as interim rules with an immediate effective date in compliance with § 41–1032, Arizona Revised Statutes, in order to comply with the December 31, 2007 deadline imposed by the United States environmental protection agency for failure to attain the national ambient air quality standard for PM–10 on or before December 31, 2006. The rules shall have an immediate effective date. Interim rules are exempt from title 41, chapter 6, article 3, Arizona Revised Statutes, except that the committee shall submit the rules for publication and the secretary of state shall publish the rules in the Arizona administrative register."

Laws 2007, Ch. 292, § 21, relating to public contracts and dust control requirements, was repealed by § 22 of that act effective October 1, 2009."

Laws 2009, Ch. 180, §§ 2 and 3, provide:

"**Sec. 2. Rule making; compliance**

"**A.** On or before June 30, 2010, the agricultural best management practices committee established by § 49–457, Arizona Revised Statutes, as amended by this act, shall adopt by rule an agricultural general permit that specifies best management practices for regulated agricultural activities to reduce PM–10 particulate emissions from dairy operations, beef cattle feed lot operations, poultry facility operations and swine facility operations.

"**B.** A person who engages in regulated agricultural activity from a dairy, a beef cattle feed lot, a poultry facility or a swine facility shall comply with the general permit within six months after the effective date of the general permit.

Administrative

Agricultural PM10 general permit, PM10 nonattainment area, see A.A.C. R18–2–610.01.

Exhibit G-V:

Redline Version of Changes from SIP Approved to Current Version of A.R.S. § 49-457

Redline Changes from 1998 SIP Approved Version of A.R.S. § 49-457 to Version Effective January 1, 2016

A.R.S. § 49-457. Agricultural best management practices committee; members; powers; permits; enforcement; preemption; definitions

A. A best management practices committee for regulated agricultural activities is established.

B. The committee shall consist of:

1. The director of environmental quality or the director's designee.
2. The director of the Arizona department of agriculture or the director's designee.
3. The dean of the college of agriculture of the university of Arizona or the dean's designee.
4. The state director of the United States natural resources conservation service or the director's designee.
5. One person actively engaged in the production of citrus.
6. One person actively engaged in the production of vegetables.
7. One person actively engaged in the production of cotton.
8. One person actively engaged in the production of alfalfa.
9. One person actively engaged in the production of grain.
10. One soil taxonomist from the university of Arizona college of agriculture.
11. One person actively engaged in the operation of a beef cattle feed lot.
12. One person actively engaged in the operation of a dairy.
13. One person actively engaged in the operation of a poultry facility.
14. One person actively engaged in the operation of a swine facility.
15. One person who is employed by a county air quality department or agency.

C. The governor shall appoint the members designated pursuant to subsection B, paragraphs 5 through 1~~0~~5 of this section for a term of sixty days~~six years~~. Members may be reappointed. Members are not entitled to compensation for their services but are entitled to receive reimbursement of expenses pursuant to ~~§ 38-611, subsection D~~ title 38, chapter 4, article 2.

D. The committee shall elect a chairman from the appointed members to serve a two year term.

E. The committee shall meet at the call of the chairman or at the request of a majority of the appointed members.

F. The department of environmental quality, the Arizona department of agriculture and the college of agriculture of the university of Arizona shall cooperate with and provide technical assistance and any necessary information to the committee. The department of environmental quality shall provide the necessary staff support and meeting facilities for the committee.

G. ~~Notwithstanding subsections I, J and K of this section,~~ A person who commences a regulated agricultural activity on the effective date of this section shall immediately comply with the agricultural general permit ~~as provided in subsection H of~~ prescribed by this section.

H. ~~By June 10, 2000,~~ The committee shall adopt, by rule, an agricultural general permit specifying best management practices, including record keeping and reporting requirements, for regulated agricultural activities to reduce PM-10 particulate emissions. A person who is subject to an agricultural general permit pursuant to this section is not subject to a permit issued pursuant to ~~§~~section 49-

426 except as provided in subsection K of this section. The committee shall adopt by rule a list of best management practices, at least one of which shall be used in areas designated as moderate nonattainment for PM-10 particulate matter and at least two of which shall be used in areas designated as serious nonattainment for PM-10 particulate matter, to demonstrate compliance with applicable provisions of the general permit ~~no later than December 31, 2001~~. Best management practices may vary within the ~~Maricopa PM-10 particulate nonattainment~~regulated area, according to regional or geographical conditions or cropping patterns. ~~The director shall submit the rule to the United States environmental protection agency as a revision to the applicable implementation plan within sixty days of adoption.~~

I. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has not previously been subject to a compliance order issued pursuant to this section, the director may serve ~~up~~on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10.~~2~~ The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than ~~six months~~sixty days, to submit a plan to the supervisors of the natural resource conservation district in which the person engages in the regulated activity that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

J. If the director determines that a person who is engaged in a regulated activity is not in compliance with the general permit, and that person has previously submitted a plan pursuant to subsection I of this section, the director may serve on the person by certified mail an order requiring compliance with the general permit and notifying the person of the opportunity for a hearing pursuant to title 41, chapter 6, article 10. The order shall state with reasonable particularity the nature of the noncompliance and shall specify that the person has a period that the director determines is reasonable, but is not less than ~~six months~~sixty days, to submit a plan to the department that specifies the best management practices from among those adopted in rule pursuant to subsection H of this section that the person will use to comply with the general permit.

K. If a person fails to comply with the plan submitted pursuant to subsection J of this section, the director may revoke the agricultural general permit for that person and ~~to~~ require that the person obtain an individual permit pursuant to ~~§~~section 49-426. A revocation becomes effective after the director has provided the person with notice and an opportunity for a hearing pursuant to title 41, chapter 6, article 10.

L. The committee may periodically reexamine, evaluate and modify best management practices. Any approved modifications shall be submitted to the United States environmental protection agency as a revision to the applicable implementation plan.

M. The committee shall develop and commence an education program~~ by June 10, 2000~~. The education program shall be conducted by the director or the director's designee or designees.

N. A best management practice adopted pursuant to this section does not affect any applicable requirements in an applicable implementation plan or any other

applicable requirements of the clean air act, including section 110(l) of the act (42 United States Code section 7410(l)).
O. The regulation of PM-10 particulate emissions produced by regulated agricultural activities is a matter of statewide concern. Accordingly, this section preempts further regulation of regulated agricultural activities by a county, city, town or other political subdivision of this state.
P. ~~In~~ For the purposes of this section, unless the context otherwise requires:
1. "Agricultural general permit" means best management practices that:
(a) Reduce PM-10 particulate emissions from tillage practices and from harvesting on a commercial farm.
(b) Reduce PM-10 particulate emissions from those areas of a commercial farm that are not normally in crop production.
(c) Reduce PM-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.
(d) Reduce PM-10 particulate emissions from those areas of a commercial farm undergoing significant agricultural earthmoving activities.
(e) Reduce PM-10 particulate emissions from the activities of a dairy, a beef cattle feed lot, a poultry facility or a swine facility, including practices relating to the following:
(i) Unpaved access connections.
(ii) Unpaved roads or feed lanes.
(iii) Animal waste handling and transporting.
(iv) Arenas, corrals and pens.
(f) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, reduce PM-10 particulate emissions from the activities of an irrigation district governed by title 48, chapter 19 and affecting those lands and facilities that are under the jurisdiction and control of the district, including practices relating to the following:
(i) Unpaved operation and maintenance roads.
(ii) Canals.
(iii) Unpaved utility access roads.
2. "Applicable implementation plan" means that term as defined in 42 United States Code section 7601(q).
3. "Best management practices" means techniques that are verified by scientific research~~,~~ and that on a case by case basis are practical, economically feasible and effective in reducing PM-10 particulate emissions from a regulated agricultural activity.
4. "Maricopa PM-10 particulate nonattainment area" means the Phoenix planning area as set forth in 40 Code of Federal Regulations section 81.303.
5. "Regulated agricultural activities" means:
(a) Commercial farming practices that may produce PM-10 particulate emissions within the ~~Maricopa pm-10 particulate nonattainment~~regulated area~~.~~, including activities of a dairy, a beef cattle feed lot, a poultry facility and a swine facility.
(b) Only in those regulated areas that are established after June 1, 2009, as prescribed in paragraph 6, subdivision (c) of this subsection, activities of an irrigation district that is governed by title 48, chapter 19.
6. "Regulated area" means any of the following:

(a) The Maricopa PM-10 particulate nonattainment area.
(b) Any portion of area A that is located in a county with a population of two million or more persons.
(c) Any other PM-10 particulate nonattainment area established in this state on or after June 1, 2009.

Exhibit G-VI:

Certified Final Rule - ADEQ Enforced Agricultural Best Management Practices Committee Rules for West Pinal County PM10 Nonattainment Area (Agricultural BMP Rules)

MICHELE REAGAN
Secretary of State
State of Arizona

UNITED STATES OF AMERICA)
) SS.
STATE OF ARIZONA)

I, MICHELE REAGAN, SECRETARY OF STATE, DO HEREBY CERTIFY THAT THE ATTACHED IS A COMPLETE, TRUE, AND CORRECT COPY OF THE FOLLOWING RULES AS PUBLISHED IN THE ARIZONA ADMINISTRATIVE REGISTER, VOLUME 21, ISSUE 30, JULY 24, 2015; AND SCHEDULED TO BE PUBLISHED IN THE 15-3 SUPPLEMENT OF THE ARIZONA ADMINISTRATIVE UPON ITS COMPLETION: R18-2-210, R18-2-610, R18-2-610.01, R18-2-610.02, R18-2-610.03, R18-2-611, R18-2-611.01, R18-2-611.02, R18-2-611.03, R18-2-612, R18-2-612.01, R18-2-613, R18-2-613.01, AND APPENDIX 2.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done this 21st day of December, 2015.

Michele Reagan

MICHELE REAGAN
Secretary of State

1700 W. Washington Street, Fl. 7
Phoenix, Arizona 85007-2808
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NOTICES OF FINAL EXEMPT RULEMAKING

This section of the *Arizona Administrative Register* contains Notices of Final Exempt Rulemaking.

The Office of the Secretary of State is the filing office and publisher of these rules. Questions about the interpretation of the final exempt rule should be addressed to the agency proposing them. Refer to Item #5 to contact the person charged with the rulemaking.

NOTICE OF FINAL EXEMPT RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY AIR POLLUTION CONTROL

[R15-63]

PREAMBLE

1. Article, Part, or Section Affected (as applicable)

Article, Part, or Section Affected (as applicable)	Rulemaking Action
R18-2-210	Amend
R18-2-610	Amend
R18-2-610.01	Amend
R18-2-610.02	New Section
R18-2-610.03	New Section
R18-2-611	Amend
R18-2-611.01	Amend
R18-2-611.02	New Section
R18-2-611.03	New Section
R18-2-612	Repeal
R18-2-612	New Section
R18-2-612.01	New Section
R18-2-613	Repeal
R18-2-613	New Section
R18-2-613.01	New Section
Appendix 2	Amend

2. Citations to the agency's statutory rulemaking authority to include the authorizing statute (general) and the implementing statute (specific), and the statute or session law authorizing the exemption:

Authorizing Statutes: A.R.S. §§ 49-104(A)(10) and 49-404(A)

Implementing Statutes: A.R.S. § 49-457

Implementing Legislative Action: Senate Bill (SB) 1408 (Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1)

Statute or Session Law Authorizing the Exemption: House Bill (HB) 2208 (Fiftieth Legislature, First Regular Session, 2011, Chapter 214, § 4)

3. The effective date of the rule and the agency's reason it selected the effective date:

July 2, 2015. HB 2208 (Fiftieth Legislature, First Regular Session, 2011, Chapter 214, § 4) states that the rule shall be effective immediately upon filing with the Secretary of State.

4. A list of all previous notices published in the *Register* as specified in R1-1-409(A) that pertain to the record of the exempt rulemaking:

Not applicable

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

Name: Heidi M. Haggerty

Address: Arizona Department of Environmental Quality
1110 W. Washington St.
Phoenix, AZ 85007

Telephone: (602) 771-4815 (This number may be reached in-state by dialing 1-800-234-5677 and requesting the seven digit number.)

Fax: (602) 771-2366
E-mail: Haggerty.Heidi@azdeq.gov

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

Summary. This rulemaking, under the authority of Senate Bill (SB) 1408 (Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1), signed by former Governor Brewer on April 16, 2010, expands the applicability of agricultural best management practices (BMPs) under A.R.S. § 49-457, to include the activities of irrigation districts in regulated areas established after June 1, 2009, which includes the Pinal County PM nonattainment area. A.R.S. § 49-457 (P)(1)(f). The BMPs are being added to reduce emissions of particulate matter by including practices related to activities of an irrigation district in moderate nonattainment areas designated after June 1, 2009, and includes BMPs from each of the categories: unpaved operation and maintenance roads, canals, and unpaved utility access roads.

In addition, this rulemaking amends the definitions of all the BMPs in order to make them more understandable, specific, and enforceable by ADEQ and the Department of Agriculture. This rulemaking also separates the rules by applicable nonattainment area (Maricopa, Moderate designated after June 1, 2009, and Pinal) for clarity and to further define more specific rules for commercial farmers and commercial animal operators within the Pinal County PM nonattainment area. Lastly, this rulemaking changes the reporting mechanisms for the crop and animal programs. Reports will be kept at the farm or animal operation each year and list the BMPs that are being implemented during the current year. Additionally, in the Pinal County PM nonattainment area, an expanded 3-year report will be turned in every three years by each farmer or animal operator with more specific information about their farms or operations. This information is necessary for an approvable State Implementation Plan (SIP) pursuant to A.R.S. §§ 49-404 and 49-406.

A.R.S. § 49-457 (F) gives rulemaking authority to the Agricultural Best Management Practices Committee (AgBMP Committee) and tasks ADEQ and the Department of Agriculture to provide technical assistance to the Committee.

Background.

History and Evolution of the AgBMP Program since 2007

Senate Bill 1552

Senate Bill (SB) 1552, which was signed by Governor Napolitano on July 2, 2007, mandated enactment of a variety of programs for reduction of PM_{10} in the Maricopa County nonattainment area and the Maricopa County portion of Area A for all contributing sources, including expansion of the AgBMP program. Forty-eighth Legislature, First Regular Session, 2007, Chapter 292, § 14. Section 20 of the bill authorized the exempt rule making that was published on December 7, 2007 (13 A.A.R. 4326). The exempt rule had an immediate effective date in compliance with section 41-1032, Arizona Revised Statutes, in order to comply with the December 31, 2007, deadline imposed by the EPA for submittal of the 5% Plan. It required that emission reductions occur during the critical winter time stagnant air condition period during which PM_{10} exceedances have historically occurred. This rulemaking was exempt from Title 41, Chapter 6, Article 3, Arizona Revised Statutes, which establishes the procedures and policies for rule making within the State agencies. Senate Bill 1552 also recognized the statutory authority, A.R.S. § 49-457, of the Governor's Agriculture Best Management Practices Committee (AgBMP Committee) to develop best management practices (BMPs) and, with the assistance of ADEQ, submit rules for publication in the *Arizona Administrative Register.*

Senate Bill 1225

SB 1225, signed by Governor Brewer on July 13, 2009, expanded the applicability of agricultural best management practices (BMPs) under A.R.S. § 49-457, to include activities of dairy, beef cattle feedlot, and poultry or swine facilities (animal operations). Forty-ninth Legislature, First Regular Session, 2009, Chapter 180, Senate Bill 1225, § 2. The BMPs were added to the rules on January 20, 2012 in order to further reduce emissions of particulate matter by including practices related to unpaved access connections, roads or feed lanes; animal waste handling and transporting; and arenas, corrals and pens. 18 A.A.R. 137. As part of the January 20, 2012 rulemaking, commercial animal operators in the Maricopa County PM_{10} nonattainment area and the Maricopa County portion of Area A were required to choose two BMPs from each category and commercial animal operators in moderate nonattainment areas designated after June 1, 2009, were required to choose one BMP from each category. The EPA designated a new West Pinal PM-10 Moderate Nonattainment Area in a Notice of Final Rulemaking published May 21, 2012 (77 FR 32024), effective July 2, 2012. The current rulemaking, further define BMP requirements for the Pinal County PM nonattainment area. Those animal operators will still have to choose one BMP from each category. In addition, commercial beef cattle feedlots will add water to pen surface on the day of a forecasted high risk day, and commercial dairy operations will apply water as a dust suppressant to roads with more than 20 Vehicle Daily Trips (VDT) on the day of a forecasted high risk day. The AgBMP Committee holds statutory authority under A.R.S.

§49-457 to develop BMPs for commercial animal operations.

Senate Bill 1408

SB 1408, signed by the Governor Brewer on April 16, 2010, expanded the applicability of the BMPs under A.R.S. § 49-457, to include the activities of irrigation districts in regulated areas established after June 1, 2009, which includes the Pinal County PM nonattainment area. Forty-ninth Legislature, Second Regular Session, 2010, Chapter 82, § 1. The current rulemaking adds BMPs to reduce particulate matter emissions from practices related to unpaved operation and maintenance roads, canals, and unpaved utility access roads. The AgBMP Committee holds statutory authority under A.R.S. §49-457 to develop BMPs for the irrigation districts.

Senate Bill 1193

SB 1193, signed by Governor Brewer on April 28, 2010, added new subsection O, which stated that the regulation of PM_{10} produced by regulated agricultural activities is a matter of statewide concern. Forty-ninth Legislature, Second Regular Session, 2010, Chapter 207, § 1. This would preclude any other county, city, town or political subdivision of this State to regulate these activities. This SB also changed the time limit for submitting a plan to the Natural Resources Conservation District (NRCD) or the department from 6 months to 60 days. These plans are only required if the director of ADEQ determines that a person engaged in a regulated activity is not in compliance with a general permit.

House Bill 2208

HB 2208, signed by Governor Brewer on April 25, 2011, added another category, Significant Agricultural Earthmoving Activities, to the crop BMPs. Fiftieth Legislature, First Regular Session, 2011, Chapter 214, § 4. These BMPs were added in the January 20, 2012 rulemaking in order to the rule to reduce particulate matter during these defined activities for Commercial farmers in Maricopa County PM_{10} nonattainment area and the Maricopa County portion of Area A and moderate nonattainment areas designated after June 1, 2009 (which included the Pinal County PM nonattainment area). 18 A.A.R. 137. Farmers in the Maricopa County serious PM_{10} nonattainment area must choose two BMPs to implement from this category. Farmers in moderate PM_{10} nonattainment areas must choose one BMP to implement from this category. In this rulemaking, farmers will need to choose only one BMP from this category for the more defined Pinal County PM_{10} nonattainment area. HB 2208 also gives the authority for the exempt rulemaking. The AgBMP Committee holds statutory authority under A.R.S. §49-457 to develop BMPs for significant agricultural earthmoving activities.

House Bill 2394

HB 2394 also amends A.R.S. § 49-457, was signed by Governor Ducey on April 9, 2015, and the statute as amended is effective from and after December 31, 2015. Fifty-second Legislature, First Regular Session, 2015, Chapter 243, § 1. The bill, in preparation for the exempt rulemaking herein, removes the 18-month delay for compliance with the agricultural general permit and requires immediate compliance with the permit. The bill also made a technical change.

Phoenix Planning area

Portions of Maricopa County were designated nonattainment for PM_{10} on November 15, 1990, under section 107(d)(4)(B) of the amended Clean Air Act (CAA). The boundaries of the nonattainment area are listed in 40 CFR § 81.303. The CAA requires state and local authorities to implement stricter particulate matter pollution controls in PM_{10} nonattainment areas. To that end, ADEQ and the Maricopa Association of Governments (MAG), acting under delegated authority, developed a state implementation plan for the area. The original plan and subsequent revisions failed to bring the area into attainment.

On June 6, 2007, at 72 FR 31183, the Environmental Protection Agency made a finding that the Phoenix Planning Area had not attained the National Ambient Air Quality Standard (NAAQS) for PM_{10} by the December 31, 2006, deadline mandated pursuant to the CAA. EPA based its Finding on monitored air quality data from 2004 through 2006.

ADEQ was required to submit by December 31, 2007, a five percent annual Reasonable Further Progress plan (5% Plan) that provides for attainment of the PM_{10} standard as required by CAA Section 189(d). The Maricopa Association of Governments (MAG) was been certified under A.A.C. 49-406 as the agency responsible for the development of the 5% Plan. The plan demonstrated three years of 5% annual reductions, which is expected to be sufficient for attainment. ADEQ submitted R18-2-610 and R18-2-611 as the agricultural community's contribution to the 5% Plan, as one of the Plan's contingency measures. On June 12, 2009, ADEQ submitted a negative declaration adopted by the Pinal County Board of Supervisors affirming that agricultural practices are not present in the Township 1 North, Range 8 East portion of this nonattainment area included within Pinal County.

On September 9, 2010, at 75 FR 54806, the Environmental Protection Agency (EPA) published a proposed rule

to approve in part and disapprove in part, the 5% Plan. EPA found, among other things, that the contingency measures did not meet the requirements of Clean Air Act (CAA) section 189(c). EPA proposed a limited approval and disapproval of R18-2-610 and R18-2-611 as submitted. EPA argued that the regulations strengthened the 5% Plan, but do not fully meet the requirements of CAA sections 100(a) and 189(b)(1)(B) for enforceable Best Available Control Measures (BACM) for agricultural sources of PM_{10} in the Maricopa Area.

On January 25, 2011, ADEQ withdrew the 5% Plan from EPA's consideration. All air quality rules and statues contained in the Plan remain in effect. MAG, ADEQ, and Maricopa County Air Quality Department (MCAQD) worked on the Plan in a cooperative and collaborative effort with the EPA, and submitted the plan on May 25, 2012. The AgBMP program, however, was not included as a control or contingency measure in the newly submitted 5% Plan. The EPA proposed approval of the Plan on February 6, 2014 at 79 FR 7118, and finalized approval of the 5% Plan on June 10, 2014 at 79 FR 33107. A maintenance plan is required to be submitted and approved by EPA before the area can be re-designated to attainment status.

Pinal County PM Nonattainment Area

The Pinal County PM Nonattainment Area includes both the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area; the boundaries of the nonattainment areas are listed in 40 CFR § 81.303. On May 31, 2012, the EPA re-designate the area of Western Pinal County from "unclassifiable" to "nonattainment" for the 1987 National Ambient Air Quality Standards (NAAQS) for PM_{10}; the redesignation was effective on July 2, 2012. On February 3, 2011, the EPA re-designated the West Central Pinal $PM_{2.5}$ planning area to nonattainment for the 2006 NAAQS for $PM_{2.5}$, after waiting to collect more monitoring data. 76 FR 6056. On September 3, 2013, the EPA determined that the West Central Pinal $PM_{2.5}$ Nonattainment Area had attained those standards based on three years of monitoring data (clean data finding) and suspended several otherwise applicable requirements for nonattainment area plans. 78 FR 54394. Both a nonattainment plan and a maintenance plan are required to be submitted and approved by EPA before the area can be re-designated to attainment status.

New Sections added specifically to address the Pinal County PM nonattainment area are:

1) 610.03. Agricultural PM General Permit for Commercial Farms; Pinal County PM Nonattainment Area,
2) 611.03 Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area,
3) R18-2-612. Definitions for R18-2-612.01, and
4) R18-2-612.01.Agricultural PM General Permit For Irrigation Districts; Moderate PM Nonattainment Areas Designated After June 1, 2009.

These sections contain identifiable control measures for the Pinal County PM nonattainment area and will be submitted to the EPA as a revision to the Arizona State Implementation Plan (SIP) along with any other Reasonably Available Control Measures (RACM) implemented to control PM emissions from identified significant sources in the area.

Section by Section Explanation of the Rules

R18-2-210. Attainment, Nonattainment, and Unclassifiable Area Designations

The rulemaking updates Arizona's incorporated by reference designation status in 40 CFR 81.303 as of July 1, 2014.

R18-2-610. Definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03

The rulemaking makes changes to many of the definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03 to provide additional clarity, specificity, and enforceability.

R18-2-610.01. Agricultural PM General Permit for Commercial Farms; Maricopa County PM Nonattainment Area

The rulemaking changes this rule to only for the Maricopa County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-610.02. Agricultural PM General Permit for Commercial Farms; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area

The rulemaking adds a new section that applies only to commercial farmers implementing AgBMPs in Moderate PM Nonattainment Areas Designated After June 1, 2009 (not including the Pinal County PM nonattainment area) and makes changes recordkeeping requirements specific to these areas.

R18-2-610.03. Agricultural PM General Permit for Commercial Farms; Pinal County PM Nonattainment Area

The rulemaking adds a new section that applies only to commercial farmers implementing AgBMPs in the Pinal

County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-611. Definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03
The rulemaking makes changes to many of the definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03 to provide additional clarity, specificity, and enforceability.

R18-2-611.01. Agricultural PM General Permit for Animal Operations; Maricopa County PM Nonattainment Areas
The rulemaking changes this rule to apply only to commercial animal operators implementing BMPs in the Maricopa County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-611.02. Agricultural PM General Permit for Animal Operations; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area
The rulemaking changes this rule to apply only to commercial animal operators implementing BMPs Moderate PM Nonattainment Areas Designated After June 1, 2009 (not including the Pinal County PM nonattainment area) and makes changes recordkeeping requirements specific to these areas.

R18-2-611.03. Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area
The rulemaking changes this rule to apply only to commercial animal operators implementing BMPs in the Pinal County PM nonattainment area and makes changes recordkeeping requirements specific to this area.

R18-2-612. Definitions for R18-2-612.01
This rulemaking repealed the Definitions for the Yuma AgBMP rule from R18-2-612, and added a new section R18-2-612 for Definitions for R18-2-612.01.

R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; Moderate PM Nonattainment Areas Designated After June 1, 2009
This rulemaking added a new section R18-2-612.01 for the implementation of BMPs for Irrigation Districts located in moderate nonattainment areas designated after June 1, 2009 (which includes the Pinal County nonattainment area).

R18-2-613. Definitions for R18-2-613.01
This rulemaking repealed the Yuma AgBMP rule at R18-2-613, and added a new section R18-2-613 for Definitions for the Yuma AgBMP rule. No changes were made to the rule text.

R18-2-613.01. Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices
This rulemaking adds a new Section for the Yuma AgBMP rule, which was repealed from R18-2-613. No changes were made to the rule text.

Appendix 2. Test Methods and Protocols
This rulemaking incorporates by reference the Silt Content Test Method to Appendix 2. This test method is used in the Phoenix Planning Area for PM_{10}.

7. **A reference to any study relevant to the rule that the agency reviewed and either relied on or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**
   None

8. **A showing of good cause why the rule is necessary to promote a statewide interest if the rulemaking will diminish a previous grant of authority of a political subdivision of this state:**
   The rule does not diminish a previous grant of authority of a political subdivision of this state.

9. **The summary of the economic, small business, and consumer impact, if applicable:**
   Not applicable to this exempt rule.

10. **A description of any changes between the proposed rulemaking, including any supplemental proposed rulemaking, and the final rulemaking package (if applicable):**
    Not applicable

11. **An agency's summary of the public or stakeholder comments made about the rulemaking and the agency response to the comments, if applicable:**
    Not applicable

12. Any other matters as prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules. When applicable, matters shall include, but not be limited to:

a. Whether the rule requires a permit, whether the general permit is used and if not, the reasons why a general permit is not used:

A general permit is used as described in A.R.S. § 49-457 (H).

b. Whether a federal law is applicable to the subject of the rule, whether the rule is more stringent than the federal law and if so, citation to the statutory authority to exceed the requirements of federal law:

Not applicable

c. Whether a person submitted an analysis to the agency that compares the rule's impact of the competitiveness of business in this state to the impact on business in other states:

No such analysis was submitted.

13. A list of any incorporated by reference material and its location in the rule:

Incorporation	Location in the rule
40 CFR 81.303 (As of July 1, 2014)	R18-2-210
NRCS Practice Code 609, Surface Roughening, amended through November 2008.	R18-2-610(53)
NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011.	R18-2-610(14), (15), (36), (47)
NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998.	R18-2-610(39), (56), R18-2-610.01(E)(1) and (E)(2), R18-2-610.02(E)(1) and (E)(2), R18-2-610.02(B)(6)(a) and (B)(6)(b)
NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009	R18-2-610(65), R18-2-611(2)(x), (3)(r), and R18-2-612(33)
Silt Content Test Method	Appendix 2, Subsection (N), incorporated into R18-2-610 (51)

14. Whether the rule was previously made, amended, repealed, or renumbered as an emergency rule. If so, the agency shall state where the text changed between the emergency and exempt rulemaking packages:

Not applicable

15. The full text of the rule follows:

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY AIR POLLUTION CONTROL

ARTICLE 2. AMBIENT AIR QUALITY STANDARDS; AREA DESIGNATIONS; CLASSIFICATIONS

Section
R18-2-210. Attainment, Nonattainment, and Unclassifiable Area Designations

ARTICLE 6. EMISSIONS FROM EXISTING AND NEW NONPOINT SOURCES

Section
R18-2-610. Definitions for ~~R18-2-611~~ R18-2-610.01, R18-2-610.02, and R18-2-610.03
R18-2-610.01. Agricultural PM_{10} General Permit for ~~Crop Operations~~ Commercial Farms; Maricopa County PM_{10} Nonattainment ~~Areas~~ Area
R18-2-610.02. Agricultural PM General Permit for Commercial Farms; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area
R18-2-610.03. Agricultural PM General Permit for Commercial Farms; Pinal County PM Nonattainment Area
R18-2-611. Definitions for R18-2-611.01, R18-2-611.02, and R18-2-611.03
R18-2-611.01. Agricultural ~~Animal Operations~~ PM_{10} General Permit for Animal Operations; ~~Moderate and Serious~~ Maricopa County PM_{10} Nonattainment Areas ~~Except Yuma County~~
R18-2-611.02. Agricultural PM General Permit for Animal Operations; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area
R18-2-611.03. Agricultural PM General Permit for Animal Operations; Pinal County PM Nonattainment Area
R18-2-612. Definitions for ~~R18-2-613~~ R18-2-612.01

R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; Moderate PM Nonattainment Areas Designated After June 1, 2009, Including Pinal County PM Nonattainment Area
R18-2-613. ~~Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices~~ Definitions for R18-2-613.01
R18-2-613.01. Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices
Appendix 2. Test Methods and Protocols

ARTICLE 2. AMBIENT AIR QUALITY STANDARDS; AREA DESIGNATIONS; CLASSIFICATIONS

R18-2-210. Attainment, Nonattainment, and Unclassifiable Area Designations
40 CFR 81.303 as amended as of July 1, ~~2011~~ 2014 (and no future amendments or editions) is incorporated by reference as an applicable requirement and on file with the Department of Environmental Quality. 40 CFR 81.303 is available from the U.S. Government Printing Office, Superintendent of Documents, bookstore.gpo.gov, Mail Stop: SSOP IDCC-SSOM, Washington, D.C. 20402-9328.

ARTICLE 6. EMISSIONS FROM EXISTING AND NEW NONPOINT SOURCES

R18-2-610. Definitions for R18-2-610.01, R18-2-610.02, and R18-2-610.03
The definitions in R18-2-101 and the following definitions apply to R18-2-610.01, R18-2-610.02, and R18-2-610.03:

1. "Access restriction" means reducing PM emissions by reducing the number of trips driven on agricultural aprons and access roads by restricting or eliminating public access to noncropland or commercial farm roads with signs or physical obstruction at locations that effectively control access to the area.
2. "Aggregate cover" means reducing PM emissions and wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to noncropland or commercial farm roads ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a depth sufficient to reduce PM emissions.
3. "Area A" means the area delineated according to A.R.S. § 49-541(1).
4. "Best management practice" (BMP) means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.
5. "Cessation of Night Tilling" means the discontinuation of ~~night~~ tillage ~~tilling~~ from sunset to sunrise on a day identified by the Maricopa or Pinal County Dust Control Forecast as being high risk of dust generation.
6. "Chemical irrigation" means reducing a minimum of one ground operation ~~reducing the number of passes~~ across a commercial farm by applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system, which reduces soil disturbance and increases efficiency of application.
7. "Chips/ mulches" means reducing PM emissions and soil movement and preserving soil moisture by applying and maintaining nontoxic chemical or organic dust suppressants to a depth sufficient to reduce PM emissions. Materials shall meet all specifications required by federal, state, or local water agencies, and is not prohibited for use by any applicable regulations.

~~7~~8. "Combining tractor operations" means reducing soil compaction and ~~the number of passes~~ a minimum of one tillage or ground operation across a commercial farm by using a tractor, implement, harvester, or other farming support vehicle to perform two or more tillage, cultivation, planting, or harvesting operations at the same time. If Equipment modification is also chosen as a BMP, and uses the same practices as described in this BMP, this action is considered one BMP.

~~8~~9. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.

10. "Commercial farm road" means a road that is unpaved, owned by a commercial farmer, and is used exclusively to service a commercial farm.

~~9~~11. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.

~~10~~12. "Committee" means the Governor's Agricultural Best Management Practices Committee as established by A.R.S. § 49-457.

13. "Conservation Tillage" means a tillage system that reduces a minimum of three tillage operations. This system reduces soil and water loss by planting into existing plant stubble on the field after harvest as well as managing the stubble so that it remains intact during the planting season.

~~11~~14. "Cover crop" means establishing cover crops that maintain a minimum of 60 percent ground cover. Native or volunteer vegetation that meets the minimum ground cover requirement is acceptable. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions). ~~reducing wind erosion and PM_{10} emissions by using plants or a green manure crop seasonally to protect soil surfaces between crops and control soil movement.~~

~~12~~15. "Critical area planting" means reducing PM_{10} emissions and wind erosion by planting trees, shrubs, vines, grasses, or other vegetative cover on noncropland in order to maintain at least 60 percent ~~adequate~~ ground cover. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions).

~~13~~16."Cropland" means land on a commercial farm that:

a. Is within the time-frame of final harvest to plant emergence, but does not include tillage activities;
b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
c. Is a turn-row.

~~14~~17."Cross-wind ridges" means stabilizing soil and reducing PM_{10} emissions and wind erosion by creating soil ridges in a commercial farm by tillage or planting operations. Ridges should be at least four inches in height, and be aligned as perpendicular as possible to the prevailing wind direction. ~~Soil should be stable enough to sustain effective ridges.~~

~~15. "Cross-wind strip-cropping" means stabilizing soil and reducing PM_{10} emissions by growing strips of at least two crops: herbaceous cover or managing crop or herbaceous residue as a protective cover within the same field. Strips should be aligned as perpendicular as possible to the prevailing wind directions.~~

18. "Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following:
    a. Projected meteorological conditions, including:
        i. Wind speed and direction,
        ii. Stagnation,
        iii. Recent precipitation, and
        iv. Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

~~16~~19. "Equipment modification" means reducing PM_{10} emissions and soil erosion during tillage ~~and~~ or ~~harvest~~ ground operations by modifying and maintaining an existing piece of agricultural equipment, ~~purchasing new equipment, increasing equipment size~~, installing shielding equipment, modifying land planting and land leveling, matching the equipment to row spacing, or grafting to new varieties or technological improvements. If combining tractor operations is also chosen as a BMP, and uses the same practices as described in this BMP, this action is considered one BMP.

~~17~~20."Fallow Field" means an area of land that is routinely cultivated, planted and harvested and is unplanted for one or more growing seasons or planting cycles, but is intended to be placed back in agricultural production.

21. "Field Capacity" means the amount of water remaining in the soil two days after having been saturated and after free drainage has ceased.

~~18~~22."Forage Crop" means a product grown for consumption by any domestic animal.

~~19~~23."Genetically Modified" (GMO) means a living organism whose genetic material has been altered, changing one or more of its characteristics.

~~20. "GMO: Genetically Modified Organism" means a plant that has been altered by a genetic exchange with another organism.~~

~~21~~24."GPS: Global Position Satellite System" means using a satellite navigation system on farm equipment to calculate position in the field.

~~22~~25. "Green ~~Chop~~ chop" means reducing soil compaction, soil disturbance and ~~the number of passes~~ a minimum of one ground operation across a commercial farm by harvesting ~~of~~ a Forage Crop without allowing it to dry in the field.

26. "Ground operation" means an agricultural operation that is not a tillage operation, which involves equipment passing across the field. A ground operation includes harvest activities. A pass through the field may be a subset of a ground operation.

27. "Harvest" means the time after planting up through harvest, including gathering mature crops from a commercial farm, as well as all actions taken immediately after crop removal, such as cooling, sorting, cleaning, and packing.

~~23~~28."Integrated Pest Management" means reducing soil compaction and ~~the number of passes in~~ a minimum of one ground operation across a commercial farm for spraying by using a combination of techniques including organic, conventional, and biological farming practices to suppress pest problems.

~~24~~29. ~~"~~Limited harvest activity ~~during a high-wind event"~~ means performing no ~~harvest or soil preparation activity~~ ground operations on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation. ~~when the measured wind speed as measured by a hand held anemometer is more than 25 miles per hour at the commercial farm site.~~

~~25~~30."Limited tillage activity ~~during a high-wind event~~" means performing no tillage operations ~~or soil preparation activity~~ on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation. ~~when the measured wind speed as measured by a hand held anemometer is more than 25 miles per hour at the commercial farm site.~~

~~26~~31."Maricopa PM_{10} nonattainment area" means the Phoenix planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.

~~27. "Mulching" means reducing PM_{10} emissions and wind erosion and preserving soil moisture by applying a protective layer of plant residue or other material that is not produced onsite to a soil surface to reduce soil movement.~~

~~28~~32."Multi-year crop" means reducing PM_{10} emissions from wind erosion ~~or~~ and a minimum of one tillage and ground operation across a commercial farm, by protecting the soil surface by growing a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.

~~29~~33."Noncropland" means any commercial farm land that:

a. Is no longer used for agricultural production;
b. Is no longer suitable for production of crops;
c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or
d. Includes a ~~private farm road,~~ ditch, ditch bank, equipment yard, storage yard, or well head.

34. "NRCS" means the Natural Resource Conservation Service.

~~30. "Night Tilling" means preparing the land for the raising of crops between the hours of 2:00 a.m. and 8:00 a.m.~~

~~31. "Organic farming practices" means using biological or non-chemical agricultural methods.~~

~~32. "Organic material application" means applying animal waste or biosolids to a soil surface.~~

35. "Organic material cover" means reducing PM emissions and wind erosion and preserving soil moisture by applying and maintaining cover material such as animal waste or plant residue, to a soil surface to reduce soil movement. Material shall be evenly applied and maintained to a depth sufficient to reduce PM emissions and coverage should be a minimum of 70 percent.

~~33~~36."Permanent cover" means reducing PM_{10} emissions and wind erosion by maintaining a long-term perennial vegetative cover on cropland that is temporarily not producing a major crop. Perennial species such as grasses and/or legumes shall be used to establish at least 60 percent cover. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions).

37. "Pinal County PM Nonattainment Area" means the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area, as defined in 40 CFR 81.303, and incorporated by reference in R18-2-210.

38. "Plant stubble" means stubble on the soil surface, which insulates soil to reduce evaporation of moisture, and also protects the soil from wind and water erosion.

~~34~~39."Planting based on soil moisture" means reducing PM emissions and wind erosion by applying water or having enough moisture in the soil to germinate the seed prior to planting. Soil must have a minimum soil moisture content of 60% of field capacity at planting depth. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions).

40. "PM" includes both particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53; and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 CFR 50 Appendix J or by an equivalent method designated in accordance with 40 CFR 53, as incorporated by reference in Appendix 2.

~~35~~41."Precision Farming" means reducing ~~the number of passes~~ the number of passes across a commercial farm by at least 12 inches per pass by using GPS to precisely guide farm equipment in the field.

~~36~~42."Reduce vehicle speed" means reducing PM_{10} emissions and soil erosion from the operation of farm vehicles or farm equipment on noncropland or commercial farm roads at speeds not to exceed ~~20~~ 15. This can be achieved through installation of engine speed governors, signage, or speed control devices.

~~37~~43. "Reduced harvest activity" means reducing soil disturbance, soil and water loss, and the number of mechanical harvest passes by a minimum of one ground operation across a commercial farm, by means other than equipment modification or combining tractor operations.

~~38~~44."Reduced tillage system" means reducing soil disturbance, soil and water loss, ~~the number of~~ by using a single piece of equipment that reduces a minimum of three tillage operations, by means other than equipment modification or combining tractor operations.

~~39~~45."Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(1)(a) through (P)(1)(d)~~(5)~~.

~~40~~46."Regulated area" means ~~a~~ the regulated area as defined in A.R.S. § 49-457(P)(6).

~~41~~47."Residue management" means reducing PM_{10} emissions and wind erosion by ~~managing the amount and distribution~~ maintaining a minimum of 60 percent ground cover of crop and other plant residues on a soil surface between the time of harvest of one crop and the ~~emergence of a~~ commencement of tillage for a new crop. Compliance shall be determined by the Line Transect Test Method, NRCS National Agronomy Manual, Subpart 503.51, Estimating Crop Residue Cover, amended through February 2011 (and no future editions).

~~42~~48."Sequential cropping" means reducing PM_{10} emissions and wind erosion by growing crops in a sequence or close rotation that limits the amount of time bare soil is exposed on a commercial farm to 30 days or less.

~~43~~49."Shuttle System/Larger Carrier" means reducing ~~the~~ one out of every four ~~number of~~ trips ~~passes~~ across a commercial farm by using multiple or larger bins/trailers ~~per trip~~ to haul commodity from the field.

~~44~~50."Significant Agricultural Earth Moving Activities" means either leveling activities conducted on a commercial farm that disturb the soil more than 4 inches below the surface, or the creation, maintenance and relocation of: ditches, canals, ponds, irrigation lines, tailwater recovery systems (agricultural sumps) and other water conveyances, not to include activities performed on cropland for tillage, ground operations ~~crop preparation, cultivation~~ or harvest.

51. "Silt content test method" means the test method as described in Appendix 2.

~~45~~52."Stabilization of soil prior to plant emergence" means reducing PM_{10} emissions by applying water to soil ~~in between planting and~~ prior to crop emergence in order to cause the soil to form a visible crust.

~~46~~53."Surface roughening" means reducing PM_{10} emissions ~~and~~ or wind erosion by manipulating a soil surface by means such as rough discing or tillage in order to produce or maintain clods on the land surface. Compliance shall be determined by NRCS Practice Code 609, Surface Roughening, amended through November 2008 (and no future editions).

~~47. "Stagnant Air Conditions" means a meteorological regime where warm air aloft overlies cooler air near the surface and little if any vertical mixing occurs.~~

~~48~~54."Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on noncropland or commercial farm roads with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~49. "Tillage and harvest" means any mechanical practice that physically disturbs cropland or crops on a commercial farm.~~

55. "Tillage" means any mechanical practice that physically disturbs the soil, and includes preparation for planting, such as plowing, ripping, or discing.

~~50~~56."Tillage based on soil moisture" means reducing PM_{10} emissions by irrigating fields to the depth of the proposed cut prior to soil disturbances or conducting tillage to coincide with precipitation. Soil must have a minimum soil moisture content of 40-60% of field capacity at planting depth. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions).

~~51~~57."Timing of a tillage operation" means reducing wind erosion and PM emissions by performing tillage operations that minimize the amount of time within 45 days. ~~the soil surface is susceptible to wind erosion resulting in PM_{10}~~.

58. "Tillage operation" means an agricultural operation that mechanically manipulates the soil for the enhancement of crop production. Examples include discing or bedding. A pass through the field may be a subset of a tillage operation.

~~52~~59."Track-out control system" means ~~reducing PM_{10} emissions~~ minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from noncropland or commercial farm roads or and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.

~~53~~60."Transgenic Crops" means reducing ~~the need~~ a minimum of one ~~for~~ tillage or ~~cultivation~~ ground operations, the number of chemical spray applications, or soil disturbances by using plants that are genetically modified.

~~54~~61."Transplanting" means reducing ~~the number of passes in~~ a minimum of one ground operation across a commercial farm and minimizing soil disturbance by utilizing plants already in a growth state as compared to seeding.

62. "VDT" (Vehicle trips per day) means trips per day made by one vehicle, in one direction.

~~55~~63."Watering" means reducing PM_{10} emissions and wind erosion by applying water to noncropland or commercial farm road bare soil surfaces during periods of high traffic until the surfaces are visibly moist.

64. "Watering on a high risk day" means reducing PM emissions and wind erosion by applying water to commercial farm road bare soil surfaces until the surfaces are visibly moist, on a day forecast to be high risk for dust generation by the Maricopa or Pinal County Dust Control Forecast.

~~56~~65."Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

~~**R18-2-610.01. Agricultural PM_{10} General Permit for Crop Operations; Maricopa County PM_{10} Nonattainment Areas**~~

~~A. A commercial farmer shall comply with this Section by January 1, 2012. Until the end of the transition period on March 31, 2013, a commercial farmer shall maintain a record demonstrating compliance with this Section. The record shall be provided to the Director within two business days of notice to the commercial farmer. The record shall contain:~~

~~1. The name of the commercial farmer;~~

~~2. The mailing address or physical address of the commercial farm; and~~

~~3. The best management practices selected for tillage and harvest, noncropland, and cropland.~~

~~B. A commercial farmer, who begins a regulated agricultural activity after January 1, 2012, shall comply with this Section within three months of beginning the regulated agricultural activity.~~

~~C~~A. A commercial farmer within the Maricopa County ~~a Serious~~ PM_{10} Nonattainment Area shall implement at least two best management practices from each category to reduce PM_{10} emissions.

~~D. A commercial farmer within a Moderate PM_{10} Nonattainment Area shall implement at least one best management practice from each category to reduce PM_{10} emissions.~~

~~E~~B. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM emissions during ~~harvest and~~ tillage, harvest or ground operation activities:

1. Chemical irrigation,
2. Combining tractor operations,
3. Equipment modification,
4. Green Chop,
5. Integrated Pest Management,
6. Limited harvest activity ~~during a high-wind event~~,
7. Limited tillage activity ~~during a high-wind event~~,
8. Multi-year crop,
9. Cessation of Night Tilling,
10. Planting based on soil moisture,
11. Precision Farming,
12. Reduced harvest activity,
13. Reduced tillage system,
14. Tillage based on soil moisture,
15. Timing of a tillage operation,
16. Transgenic Crops,
17. Transplanting, ~~or~~
18. Shuttle System/Larger Carrier, or
19. Conservation Tillage.

~~F~~C. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM_{10} emissions from noncropland and commercial farm roads:

1. Access restriction,
2. Aggregate cover,
3. Wind barrier,
4. Critical area planting,
5. Organic material ~~application~~ cover,
6. Reduce vehicle speed,
7. Synthetic particulate suppressant,
8. Track-out control system, or
9. Watering.

~~G~~D. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM_{10} emissions from cropland:

1. Wind barrier,
2. Cover crop,
3. Cross-wind ridges,
4. ~~Cross-wind strip-cropping,~~
5. ~~Integrated Pest Management,~~
6. ~~Organic material application~~ Chips/mulches,
7. ~~Mulching,~~
8. Multi-year crop,
9. Permanent cover,
10. Stabilization of soil prior to plant emergence,
11. ~~Precision Farming,~~
12. Residue management,
13. Sequential cropping, or
14. Surface roughening.

~~H~~E. A commercial farmer shall implement from the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, to reduce PM emissions when conducting Significant Agricultural Earth Moving Activities as defined in R18-2-610:

1. Apply water prior to conducting Significant Agricultural Earth Moving Activities and/or time Significant Agricultural Earth Moving Activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);

2. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
3. Limit activities ~~during high wind events~~ on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation; or
4. Conduct Significant Agricultural Earth Moving Activities in a manner to ~~minimize the number of passes~~ reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.~~; or~~
5. ~~Conduct Significant Agricultural Earth Moving Activities as close to possible to planting or otherwise stabilize the soil, except for emergency maintenance purposes~~

~~I. Beginning March 31, 2013, or within 90 days after the start of a new regulated agricultural activity, whichever is later, the commercial farmer shall complete and submit a Best Management Practices Program General Permit Record Form to the Arizona Department of Agriculture. Thereafter, the commercial farmer shall also complete and submit a Best Management Practices Program General Permit Record Form to the Arizona Department of Agriculture on March 31 of each calendar year. The Best Management Practice Program General Permit Record form shall include the following information:~~

1. ~~At least the required number of best management practices as described in subsection (C) or (D) that the commercial farmer implemented during the previous calendar year;~~
2. ~~At least the required number of best management practices as described in subsection (C) or (D) that the commercial farmer intends to implement during the current calendar year;~~
3. ~~The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices;~~
4. ~~The signature of the commercial farmer and the date the form was signed.~~

F. From and after December 31, 2015, a commercial farmer who engages in a regulated agricultural activity shall complete and maintain a Best Management Practices Program General Permit Record Form demonstrating compliance with this Section. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial farmer. The Best Management Practice Program General Permit Record Form shall include the following information:

1. The name of the commercial farmer, signature, and date signed;
2. The mailing address or physical address of the commercial farm; and
3. The best management practices selected for tillage, harvest, and ground operation activities, cropland, noncropland and commercial farm roads, and significant earth moving activities (if applicable).

~~J. Beginning in Calendar Year 2014, and no more than once every subsequent three calendar years, the Director shall provide the commercial farmer with a Best Management Practices Program Periodic Survey. The commercial farmer may complete and submit the survey to the Arizona Department of Agriculture. The Periodic Survey shall include the following information:~~

1. ~~The type and acreage of each crop type planted during the calendar year that the survey is conducted;~~
2. ~~The total miles of unpaved roads at the commercial farm, and~~
3. ~~The total acreage of the unpaved equipment and traffic areas at the commercial farm.~~

~~K~~G. Records of any changes to the Best Management Practices identified in the most recently submitted Best Management Practices Program General Permit Record Form shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.

~~L~~H. A person may develop ~~petition the Committee to consider~~ different practices to control PM_{10} emissions not contained in ~~either of the categories of subsection~~ subsections (B), (C), (D), or (E) ~~(E), (F), (G), or (H). The Committee may require~~ and may submit such practices that are proven effective through on-farm demonstration trials to ~~be conducted under the conditions established by~~ the Committee. The proposed new practices shall not become effective unless submitted ~~approved by the Committee~~ as described in A.R.S. § 49-457(L).

~~M~~I. A commercial farmer shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

~~N~~J. The Director shall not assess a fee to a commercial farmer for coverage under the agricultural PM_{10} general permit.

~~O~~K. A commercial farmer shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

~~P~~L. The Director shall document noncompliance with this Section before issuing a compliance order.

~~Q~~M. A commercial farmer who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-610.02. Agricultural PM General Permit for Crop Operations; Moderate PM Nonattainment Areas, Designated After June 1, 2009

A. A commercial farmer within a PM Moderate Nonattainment Area, designated after June 1, 2009, shall implement at least one best management practice from each category to reduce PM emissions.

B. A commercial farmer shall implement from the following best management practices, as described in subsection (A), to reduce PM emissions during tillage, harvest and ground operation activities:

1. Chemical irrigation.

2. Combining tractor operations,
3. Equipment modification,
4. Green Chop,
5. Integrated Pest Management,
6. Limited harvest activity,
7. Limited tillage activity,
8. Multi-year crop,
9. Cessation of Night Tilling,
10. Planting based on soil moisture,
11. Precision Farming,
12. Reduced harvest activity,
13. Reduced tillage system,
14. Tillage based on soil moisture,
15. Timing of a tillage operation,
16. Transgenic Crops,
17. Transplanting, or
18. Shuttle System/Larger Carrier, or
19. Conservation Tillage.

C. A commercial farmer shall implement from the following best management practices, as described in subsection (A), to reduce PM emissions from noncropland and commercial farm roads:
1. Access restriction,
2. Aggregate cover,
3. Wind barrier,
4. Critical area planting,
5. Organic material cover,
6. Reduce vehicle speed,
7. Synthetic particulate suppressant,
8. Track-out control system, or
9. Watering.

D. A commercial farmer shall implement from the following best management practices, as described in subsection (A), to reduce PM emissions from cropland:
1. Wind barrier,
2. Cover crop,
3. Cross-wind ridges,
4. Chips/mulches,
5. Multi-year crop,
6. Permanent cover,
7. Stabilization of soil prior to plant emergence,
8. Residue management,
9. Sequential cropping, or
10. Surface roughening.

E. A commercial farmer shall implement from the following best management practices, as described in subsection (A), when conducting Significant Agricultural Earth Moving Activities as defined in R18-2-610:
1. Apply water prior to conducting Significant Agricultural Earth Moving Activities and/or time Significant Agricultural Earth Moving Activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
2. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
3. Limit activities on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation; or
4. Conduct Significant Agricultural Earth Moving Activities in a manner to reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.

F. From and after December 31, 2015, a commercial farmer who engages in a regulated agricultural activity shall complete and maintain a Best Management Practices Program General Permit Record Form demonstrating compliance with this Section. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial farmer. The Best Management Practice Program General Permit Record Form shall include the following information:
1. The name of the commercial farmer, signature, and date signed;
2. The mailing address or physical address of the commercial farm; and

3. The best management practice selected for tillage, harvest and ground operation activities, cropland, noncropland and commercial farm roads, and significant earth moving activities (if applicable).

G. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.

H. A person may develop different practices to control PM emissions not contained in subsections (B), (C), (D), or (E) and may submit such practices that are proven effective through on-farm demonstration trials to the Committee. The proposed new practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

I. A commercial farmer shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

J. The Director shall not assess a fee to a commercial farmer for coverage under the agricultural PM general permit.

K. A commercial farmer shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

L. The Director shall document noncompliance with this Section before issuing a compliance order.

M. ~~A commercial farmer who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).~~

R18-2-610.03. Agricultural PM General Permit for Crop Operations; Pinal County PM Nonattainment Area

A. On the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of best management practices as described in sections (B)(1)(b), (B)(2)(b), (B)(3)(b), (B)(4)(b), and (B)(5)(b).

B. On all days, a commercial farmer shall implement at least one best management practice from each category to reduce PM emissions, as described below in subsections (1)(a), (2)(a), (3)(a), (4)(a), and (6), and at least two best management practices from subsection (5)(a). If a commercial farmer implements the Conservation tillage or Reduced tillage system best management practice for the tillage category, they do not have to implement a best management practice from the subsections (2)(a), (2)(b), (5)(a) and (5)(b).

1. Tillage:
   a. A commercial farmer shall implement at least one of the following:
      i. Combining tractor operations,
      ii. Equipment modification,
      iii. Multi-year crop,
      iv. Cessation of night tilling,
      v. Planting based on soil moisture,
      vi. Precision farming,
      vii. Tillage based on soil moisture,
      viii. Timing of a tillage operation,
      ix. Transgenic crops,
      x. Transplanting,
      xi. Reduced tillage system, or
      xii. Conservation tillage.
   b. Unless choosing limited tillage activity (subsection iv, below), on the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of at least one of the following:
      i. Multi-year crop,
      ii. Planting based on soil moisture,
      iii. Tillage based on soil moisture,
      iv. Limited tillage activity,
      v. Reduced tillage system, or
      vi. Conservation tillage.
2. Ground Operations and Harvest:
   a. A commercial farmer shall implement at least one of the following:
      i. Combining tractor operations,
      ii. Equipment modification,
      iii. Chemical irrigation,
      iv. Green chop,
      v. Integrated pest management,
      vi. Multi-year crop,
      vii. Precision farming,
      viii. Reduced harvest activity,
      ix. Transgenic crops, or
      x. Shuttle System/Larger Carrier.

b. Unless choosing limited harvest activity (subsection iv, below), on the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of at least one of the following:
   i. Green chop,
   ii. Integrated pest management,
   iii. Multi-year crop, or
   iv. Limited harvest activity.

3. Noncropland:
   a. A commercial farmer shall implement at least one of the following best management practices:
      i. Access restriction,
      ii. Aggregate cover,
      iii. Wind barrier,
      iv. Critical area planting,
      v. Organic material cover,
      vi. Reduce vehicle speed,
      vii. Synthetic particulate suppressant, or
      viii. Watering.
   b. Unless choosing watering on a high risk day (subsection vi, below), on the day before and during a day forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a on a noncropland area that experiences more than 20 VDT from 2 or more axle vehicles, commercial farmer shall ensure implementation of at least one of the following best management practices:
      i. Aggregate cover,
      ii. Wind barrier,
      iii. Critical area planting,
      iv. Organic material cover,
      v. Synthetic particulate suppressant, or
      vi. Watering on a high risk day.
4. Commercial farm roads:
   a. A commercial farmer shall implement at least one of the following best management practices:
      i. Access restriction,
      ii. Reduce vehicle speed,
      iii. Track-out control system,
      iv. Aggregate cover,
      v. Synthetic particulate suppressant,
      vi. Watering, or,
      vii. Organic material cover.
   b. Unless choosing watering on a high risk day (subsection vi, below), on the day before and during a day forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, on a road that experiences more than 20 VDT from 2 or more axle vehicles, a commercial farmer shall ensure implementation of at least one of the following best management practices:
      i. Aggregate cover,
      ii. Synthetic particulate suppressant,
      iii. Wind barrier,
      iv. Organic material cover,
      v. Roads are stabilized as determined by the silt content test method,
      vi. Watering on a high risk day.
5. Cropland:
   a. A commercial farmer shall implement at least two of the following best management practices, one from subsection (i) through (vii), and one from subsection (viii) through (xi), to reduce PM emissions from cropland:
      i. Wind barrier,
      ii. Cover crop,
      iii. Cross-wind ridges,
      iv. Chips/mulches,
      v. Sequential cropping
      vi. Residue management,
      vii. Surface roughening,
      viii. Multi-year crop,
      ix. Permanent cover, or
      x. Stabilization of soil prior to plant emergence.

b. On the day before and during the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, a commercial farmer shall ensure implementation of at least one of the following:
   i. Wind barrier,
   ii. Cover crop,
   iii. Cross-wind ridges,
   iv. Chips/mulches,
   v. Surface roughening,
   vi. Multi-year crop,
   vii. Permanent cover,
   viii. Stabilization of soil prior to plant emergence, or
   ix. Residue management.

6. A commercial farmer shall implement at least one of the following best management practices, when conducting Significant Agricultural Earth Moving Activities as defined in R18-2-610:
   a. Apply water prior to conducting Significant Agricultural Earth Moving Activities and/or time Significant Agricultural Earth Moving Activities to coincide with precipitation. Soil must have a minimum soil moisture content of 50% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
   b. Apply water during Significant Agricultural Earth Moving Activities. Soil must have a minimum soil moisture content of 30% of field capacity. Compliance shall be determined by NRCS Estimating Soil Moisture by Feel and Appearance Method, amended through April 1998 (and no future editions);
   c. Limit activities on a day identified by the Maricopa or Pinal County Dust Control Forecast to be high risk for dust generation; or
   d. Conduct Significant Agricultural Earth Moving Activities in a manner to reduce a minimum of one ground operation across a commercial farm by using equipment that is the most efficient means of moving the soil.

C. From and after December 31, 2015, a commercial farmer who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form demonstrating compliance with this rule. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial farmer. The Best Management Practice Program General Permit Record Form shall include the following information:
   1. The name of the commercial farmer, signature, and date signed;
   2. The mailing address or physical address of the commercial farm; and
   3. The best management practices selected for tillage, ground operations and harvest, cropland, noncropland, commercial farm roads, and significant earth moving activities (if applicable); and
   4. Any additional best management practices selected for high risk days as predicted by the Pinal County Dust Control Forecast.

D. Beginning in calendar year 2017, and no more than once every subsequent three calendar years, the Director, in conjunction with the Arizona Department of Agriculture, shall provide the commercial farmer with a Best Management Practices Program 3-year Survey. The commercial farmer shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA) by January 31, 2018, and every three years thereafter. The Survey information submitted to the ADA shall be compiled by the ADA without reference to a commercial farmer's name, shall aggregate the data from the Surveys received, and be submitted to the Department. The 3-year Survey shall include the following information:
   1. The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices;
   2. The signature of the commercial farmer and the date the form was signed;
   3. The acreage of each crop type planted/growing during the calendar year that the survey is conducted;
   4. The total miles of commercial farm roads at the commercial farm;
   5. The total acreage of the noncropland at the commercial farm;
   6. The best management practices selected for tillage, ground operations and harvest, cropland, noncropland, commercial farm roads, and significant earth moving activities (if applicable); and
   7. Any additional best management practices selected for high risk days as predicted by the Pinal County Dust Control Forecast.

E. Records of any changes to the Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the commercial farmer onsite and made available for review by the Director within two business days of notice to the commercial farmer.

F. A person may develop different practices to control PM emissions not contained in subsections (B)(1) through (B)(6) and may submit such practices that are proven effective through on-farm demonstration trials to the Committee. The proposed new practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

G. A commercial farmer shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

H. The Director shall not assess a fee to a commercial farmer for coverage under the agricultural PM general permit.

I. A commercial farmer shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.
J. The Director shall document noncompliance with this Section before issuing a compliance order.
K. A commercial farmer who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-611. Definitions for R18-2-611.01

The definitions in R18-2-101 and the following definitions apply to R18-2-611.01~~:~~, R18-2-611.02, and R18-611.03:

1. The following definitions apply to a commercial dairy operation, a commercial beef feedlot, a commercial poultry facility, and commercial swine facility:
   a. "Animal waste handling and transporting" means the processes by which any animal excretions and mixtures containing animal excretions are collected and transported.
   b. "Arenas, corrals and pens" means areas where animals are confined for the purposes of, but not limited to, feeding, displaying, safety, racing, exercising, or husbandry.
   c. "Commercial animal operation" means a commercial dairy operation, a commercial beef feedlot, a commercial poultry facility, and a commercial swine facility, as defined in this Section.
   d. "Commercial animal operator" means an individual, entity, or joint operation in general control of a commercial animal operation.
   e. "Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following:
      i. Projected meteorological conditions, including:
         (1) Wind speed and direction,
         (2) Stagnation,
         (3) Recent precipitation, and
         (4) Potential for precipitation;
      ii. Existing concentrations of air pollution at the time of the forecast; and
      iii. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
   f. "High traffic areas" means areas that experience more than 20 VDT from 2 or more axle vehicles.
   g. "Maricopa PM nonattainment area" means the Phoenix planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.
   h. "Paved Public Road" means any paved roadways that are open to public travel and maintained by a City, County, State, or Federal entities.
   i. "Pinal County PM Nonattainment Area" means the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area, as defined in 40 CFR 81.303, and incorporated by reference in R18-2-210.
   j. "PM" includes both particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53; and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 CFR 50 Appendix J or by an equivalent method designated in accordance with 40 CFR 53, as incorporated by reference in Appendix 2.
   k. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).
   l. "Regulated area" means the regulated area as defined in A.R.S. § 49-457(P)(6).
   m. "Track-out control device" means minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved access connections and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.
   n. "Unpaved access connections" means any unpaved road connection which connects to a paved public road.
   o. "Unpaved roads or feed lanes" means roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation.
   p. "VDT" (Vehicle trips per day) means trips per day made by one vehicle, in one direction.

~~1~~2. The following definitions apply to a commercial dairy operation:
   a. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.
   b. "Apply a fibrous layer" means reducing PM_{10} emissions and soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Material shall be consistently applied to a minimum depth of two inches above the soil surface and coverage should be a minimum of 70 percent.

c. "Bunkers" means below ground level storage systems for storing large amount of silage, which is covered with a plastic tarp.
d. "Calves" means young dairy stock under two months of age.
e. "Cement cattle walkways to milk barn" means reducing PM_{10} emissions by fencing pathways from the corrals to the milking barn, ~~which are~~ restricting dairy cattle to surfaces with concrete floors.
~~f. "Commercial animal operator" means an individual, entity, or joint operation in general control of an animal operation.~~
~~g~~f. "Commercial dairy operation" means a dairy operation with more than 150 dairy cattle within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.
~~h~~g. "Cover manure hauling trucks" means reducing PM_{10} emissions by completely covering the top of the loaded area.
~~i~~h. "Covers for silage" means reducing PM_{10} emissions and wind erosion by using large plastic tarps to completely cover silage.
~~j~~i. "Do not run cattle" means reducing PM_{10} emissions by walking dairy cattle to the milking barn.
~~k~~j. "Feed higher moisture feed to dairy cattle" means reducing PM_{10} emissions by feeding dairy cattle one or ~~a~~ any combination of the following:
   i. Add water to ration mix to achieve a 20% minimum moisture level,
   ii. Add molasses or tallow to ration mix at a minimum of 1%,
   iii. Add silage, or
   iv. Add ~~Green~~ green ~~Chop~~ chop.
~~l~~k. "Feed green chop" means feeding high moisture feed that contains at least 30% moisture directly to dairy cattle.
~~m~~l. "Groom manure surface" means reducing PM_{10} emissions and wind erosion by:
   i. Flushing or vacuuming lanes daily,
   ii. Scraping and harrowing pens on a weekly basis, and
   iii. Removing manure every four months with equipment that leaves an even corral surface of compacted manure on top of the soil.
~~n~~m. "Hutches" means raised, roofed enclosures that protect the calves from the elements.
~~o~~n. "Pile manure between cleanings" means reducing PM_{10} emissions by collecting loose surface materials within the confines of the surface area of the occupied feed pen every two weeks. ~~to contain the loose manure materials.~~
~~p~~o. "Provide cooling in corral" means reducing PM_{10} emissions by using cooling systems ~~evaporative coolers~~ under the corral shades to reduce the ambient air temperature, thereby increasing stocking density in the cool areas of the corrals.
~~q~~p. "Provide shade in corral" means reducing PM_{10} emissions by increasing stocking density and reducing animal movement by using a permanent structure, which provides at least 16 square feet per animal of shaded pen surface.
~~r~~q. "Push equipment" means manure harvesting equipment pushed in front of a tractor.
~~s. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~
~~t. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~
~~u~~r. "Silage" means fermented, high-moisture fodder that can be fed to ruminants, such as cattle and sheep; usually made from grass crops including corn, sorghum or other cereals, by using the entire green plant.
~~v~~s. "Store and maintain feed stock" means reducing PM_{10} emissions and wind erosion by storing feed stock in a covered area where the commodity is surrounded on at least three sides by a structure. ~~so that the feed stock is adequately contained~~.
~~w~~t. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial dairy operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.
~~x~~u. "Use drag equipment to maintain pens" means reducing PM_{10} emissions by using manure ~~harvesting~~ equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions.
~~y~~v. "Use free stall housing" means reducing PM_{10} emissions by enclosing one cow per stall, which are outfitted with concrete floors.
~~z~~w. "Water misting systems" means reducing PM_{10} emissions from dry manure by using systems that project a cloud of very small water particles onto the manure surface, keeping the surface visibly moist.
~~aa~~x. "Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing

wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

~~2~~3. The following definitions apply to a commercial beef cattle feedlot:

a. "Add moisture to pen surface" means reducing PM_{10} emissions and wind erosion by applying at least three to six gallons of water per head/per day in pens occupied by beef cattle.

b. "Add molasses or tallow to feed" means reducing PM_{10} emissions by adding molasses or tallow so that it equals ~~five~~ three percent of the total ration.

c. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.

d. "Apply a fibrous layer in working areas" means reducing PM_{10} emissions and soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Material shall be consistently applied to a minimum depth of two inches above the soil surface and coverage should be a minimum of 70 percent.

e. "Bulk materials" means reducing PM_{10} emissions by using a closed conveyor system instead of vehicular means to move grain or other feedstuffs via non-vehicular means~~, distributing or hauling grain, supplements, or mixed feeds via motorized vehicle~~

~~f. "Commercial animal operator" means an individual, entity, or joint operation in general control of an animal operation.~~

~~g~~f. "Commercial beef cattle feedlot" means a beef cattle feedlot with more than 500 beef cattle within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.

~~h~~g. "Concrete apron" means reducing PM_{10} emissions by using solidly formed concrete surface, at least 4 inches thick on top of the soil surface, inside the feed pen for 8 feet approaching the feed bunk or water trough.

~~i~~h. "Control cattle during movements" means reducing PM_{10} emissions by suppressing the animal's ability to run by driving them forward while intruding on their "flight zones" or restraining the animal's movement.

~~j~~i. "Cover manure hauling trucks" means reducing PM_{10} emissions by completely covering the top of the loaded area.

~~k~~j. "Feed higher moisture feed to beef cattle" means reducing PM_{10} emissions by feeding beef cattle feed that contains at least 30% moisture.

~~l~~k. "Frequent manure removal" means reducing PM_{10} emissions and wind erosion by harvesting loose manure on top of the pen surface at least once every six months.

~~m. "Higher moisture feeds" means reduce PM_{10} emissions by feeding beef cattle feed that contains at least 30% moisture.~~

~~n. "Increase manure moisture" means reducing PM_{10} emissions by increasing the fluids consumed and excreted by cattle.~~

~~o~~l. "Pile manure between cleanings" means reducing PM_{10} emissions by collecting loose manure surface materials, by scraping or pushing, within the confines of the surface area of the occupied feed pen at least four times per year. ~~to contain the loose manure materials.~~

~~p~~m. "Provide shade in corral" means reducing PM_{10} emissions by increasing stocking density and reducing animal movement by using a permanent structure, which provides at least 16 square feet per animal of shaded pen surface.

~~q~~n. "Push equipment" means manure harvesting equipment pushed in front of a tractor.

~~r. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~

~~s. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~

~~t~~o. "Store and maintain feed stock" means reducing PM_{10} emissions and wind erosion by storing feed stock in a covered area where the commodity is surrounded on at least three sides by a structure. ~~so that the feed stock is adequately contained~~.

~~u~~p. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial beef feedlot with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~v~~q. "Use drag equipment to maintain pens" means reducing PM_{10} emissions by using manure harvesting equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions.

~~w~~r. "Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

~~3~~4. The following definitions apply to a commercial poultry facility:

a. "Add moisture through ventilation systems" means reducing PM_{10} emissions by using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while ~~adding sufficient~~ maintaining a minimum of 20% moisture in ~~to~~ the air within the housing system to bind small particles to larger particles.

b. "Add oil and/or moisture to the feed" means reducing PM_{10} emissions by adding a minimum of 1% edible oil and/or moisture to feed rations to bind small particles to larger particles.

c. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.

d. "Clean aisles between cage rows" means reducing PM_{10} emissions by cleaning the aisles between cage rows at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.

e. "Clean fans, louvers, and soffit inlets in a commercial poultry facility" means reducing PM_{10} emissions by cleaning fans, louvers, and soffit inlets when the facility is empty between depopulating and populating the facility.

f. "Clean floors and walls in a commercial poultry facility" means reducing PM_{10} emissions by cleaning floors and walls to prevent dried manure, spilled feed, and debris accumulation when the facility is empty between depopulating and populating the facility.

~~g. "Commercial animal operator" means an individual, entity, or joint operation in general control of an animal operation.~~

~~h~~g. "Commercial poultry facility" means a poultry operation with more than 25,000 egg laying hens within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area.

~~i~~h. "Control vegetation on building exteriors" means reducing PM_{10} emissions by removing, cutting, or trimming vegetation that accumulates PM_{10} and restricts ventilation of the building, so as to leave approximately three feet between the vegetation and building.

~~j~~i. "Enclose transfer points" means reducing PM_{10} emissions by enclosing the points of transfer between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduce air contact with the feed rations during feed conveyance.

~~k~~j. "House in fully enclosed ventilated buildings" means reducing PM_{10} emissions by utilizing fully enclosed buildings with sufficient ventilation.

~~l~~k. "Maintain moisture in manure solids" means reducing PM_{10} emissions by maintaining a moisture content of a minimum of 15% in the solids sufficient to bind small particles to larger particles.

~~m~~l. "Minimize drop distance" means reducing PM_{10} emissions by designing the feed distribution system ~~to minimize the~~ so that the distance the feed ration drops from the feed distribution system into feeders is approximately 1 foot or less, which reduces air contact with the feed rations during feed conveyance.

~~n~~m. "Poultry" means any domesticated bird including chickens, turkeys, ducks, geese, guineas, ratites and squabs.

~~o. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~

~~p. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~

~~q~~n. "Remove spilled feed" means reducing PM_{10} emissions by removing spilled feed from the housing facility at least once every 14 days.

~~r~~o. "Stack separated manure solids" means reducing PM_{10} emissions and wind erosion by reducing the amount of exposed surface area of manure solids.

~~s~~p. "Store feed" means reducing PM_{10} emissions by storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage.

~~t~~q. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial poultry operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~u~~r. "Use enclosed feed distribution system" means reducing PM_{10} emissions by using an enclosed feed conveyance system that distributes feed rations throughout the housing facility, which reduces air contact with the feed rations during feed conveyance.

~~v~~s. "Use a flexible discharge spout" means reducing PM_{10} emissions and wind erosion at the time of bulk feed deliveries to the housing units by using a flexible discharge spout on the end of the feed truck transfer auger.

~~w~~t. "Use no bedding in the production facility" means reducing PM_{10} emissions by not using bedding such as wood shavings, sawdust, peanut hulls, straw, or other organic material.

~~4~~5. The following definitions apply to a commercial swine facility:

a. "Add oil and/or moisture to the feed" means reducing PM_{10} emissions by adding a minimum of 0.5% edible oil and/or moisture to feed rations to bind small particles to larger particles.

b. "Add moisture through ventilation systems" means reducing PM_{10} emissions by using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while ~~adding sufficient~~ maintaining minimum of 15% moisture ~~to~~ in the air within the housing system to bind small particles to larger particles.

c. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material ~~applied~~ to unpaved roads or feed lanes ~~to a depth sufficient to reduce dust generated from vehicle movement, wind or other erosive forces~~. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of three inches deep.

d. "Clean aisles between pens and stalls" means reducing PM_{10} emissions by cleaning the aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.

e. "Clean fans, louvers, and soffit inlets in a commercial swine facility" means reducing PM_{10} emissions by cleaning fans, louvers, and soffit inlets between transfer of animal groups, but in any case, at least every 6 months.

f. "Clean pens, floors and walls in a commercial swine facility" means reducing PM_{10} emissions by cleaning pens, floors, and walls between transfer of animal groups to prevent dried manure, spilled feed, and debris accumulation, but in any case, at least every 6 months.

~~g. "Commercial animal operator" means an individual, entity, or joint operation in general control of a animal operation.~~

~~h~~g. "Commercial swine facility" means a swine operation with more than 50 animal units for more than 30 consecutive days within the boundary of the Maricopa PM_{10} nonattainment area and Maricopa County portion of Area A, ~~or~~ a PM_{10} nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area. One thousand pounds equals one animal unit.

~~i~~h. "Control vegetation on building exteriors" means reducing PM_{10} emissions by removing, cutting, or trimming vegetation that accumulates PM_{10} and restricts ventilation of the building, so as to leave approximately three feet between the vegetation and the building.

~~j~~i. "Enclose transfer points" means reducing PM_{10} emissions by enclosing the points of transfer between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduces air contract with the feed rations during feed conveyance.

~~k~~j. "House in fully enclosed ventilated buildings" means reducing PM_{10} emissions by utilizing fully enclosed buildings with sufficient ventilation.

~~l~~k. "Lagoon" means a liquid manure storage and treatment pond.

~~m~~l. "Maintain moisture in manure solids" means reducing PM_{10} emissions by maintaining a minimum moisture content of 10% in the solids sufficient to bind small particles to larger particles.

~~n~~m. "Minimize drop distance" means reducing PM_{10} emissions by designing the feed distribution system ~~to minimize the~~ so that the distance the feed ration drops from the feed distribution system into feeders is three feet or less, which reduces air contact with the feed rations during feed conveyance.

~~o. "Regulated agricultural activity" means a regulated agricultural activity as defined in A.R.S. § 49-457(P)(5).~~

~~p. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6).~~

~~q~~n. "Remove spilled feed" means reducing PM_{10} emissions by removing spilled feed from the housing facility at least once every 14 days.

~~r~~o. "Slatted flooring" means reducing PM_{10} emissions by using flooring that is a slotted concrete or wire-mesh floor set above a liquid manure collection pit, which allows the excrement to fall though the flooring into the liquid pit below, which prevents solids build-up. Slats 4 to 8 inches wide with spacing of about 1 inch in between are recommended.

~~sp~~. "Sloped concrete flooring" means reducing PM_{10} emissions by pouring concrete with a minimum of 0.25% grade inside of the barns which provides drainage and easier cleaning of floor areas.

~~tq~~. "Stack separated manure solids" means reducing PM_{10} emissions and wind erosion by reducing the amount of exposed surface area of manure solids.

~~ur~~. "Store feed" means reducing PM_{10} emissions by storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage.

~~vs~~. "Store separated manure solids" means reducing PM_{10} emissions by storing manure solids in a wind-blocked area behind a wall, structure, or area with natural wind protection to minimize blowing air movement over the manure stack.

~~wt~~. "Synthetic particulate suppressant" means reducing PM_{10} emissions and wind erosion by providing a ~~surface barrier or binding soil particles together~~ stabilized soil surface on a commercial swine operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

~~xu~~. "Use a flexible discharge spout" means reducing PM_{10} emissions and wind erosion at the time of bulk feed deliveries to the housing units by using a flexible discharge spout on the end of the feed truck transfer auger.

~~yv~~. "Use enclosed feed distribution system" means reducing PM_{10} emissions by using an enclosed feed conveyance system that distributes feed rations throughout the housing facility, which reduces air contact with the feed rations during the feed conveyance.

~~zw~~. "Use no bedding in the production facility" means reducing PM_{10} emissions by not using bedding such as wood shavings, sawdust, peanut hulls, straw, or other organic material.

~~R18-2-611.01. Agricultural Animal Operations PM_{10} General Permit for Animal Operations; Moderate and Serious Maricopa County PM_{10} Nonattainment Areas Except Yuma County~~

~~A. A commercial animal operator in a regulated area shall comply with this Section by March 1, 2013.~~

~~B. A commercial animal operator, who begins a regulated agricultural activity after January 1, 2012, shall comply with this Section within 18 months of beginning the regulated agricultural activity.~~

~~C~~A. A commercial animal operator within a Serious PM_{10} Nonattainment Area shall implement at least two best management practices from each category to reduce PM_{10} emissions.

~~D. A commercial animal operator within a Moderate PM_{10} Nonattainment Area shall implement at least one best management practice from each category to reduce PM_{10} emissions.~~

~~E~~B. A commercial dairy operation shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Use free stall housing,
   b. Provide shade in corral,
   c. Provide cooling in corral,
   d. Cement cattle walkways to milk barn,
   e. Groom manure surface,
   f. Water misting systems,
   g. Use drag equipment to maintain pens,
   h. Pile manure between cleanings,
   i. Feed green chop,
   j. Keep calves in barns or hutches,
   k. Do not run cattle,
   l. Apply a fibrous layer, or
   m. Wind barrier.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to dairy cattle,
   b. Store and maintain feed stock,
   c. Covers for silage,
   d. Store silage in bunkers,
   ~~e. Increase manure moisture,~~
   ~~f~~e. Cover manure hauling trucks, or
   ~~g~~f. Do not load manure trucks with dry manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install signage to limit vehicle speed to 15 mph,
   b. Install speed control devices,
   c. Restrict access to through traffic,
   d. Install and maintain a track-out control device,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant, or

~~h.~~ Apply and maintain water as a dust suppressant.

4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant,
   i. Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks, or
   j. Apply and maintain pavement or cement feed lanes.

~~F~~C. A commercial beef cattle feedlot shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Concrete aprons,
   b. Provide shade in corral,
   c. Add moisture to pen surface,
   d. Manure removal,
   e. Pile manure between cleanings,
   ~~f. Increase Manure Moisture,~~
   ~~g~~f. Feed higher moisture feed to beef cattle,
   ~~h~~g. Control cattle during movements,
   ~~i~~h. Use drag equipment to maintain pens,
   ~~j~~i. Apply a fibrous layer, or
   ~~k~~j. Wind barrier.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to beef cattle,
   b. Add molasses or tallow to feed,
   c. Store and maintain feed stock,
   d. Bulk materials,
   e. Use drag equipment to maintain pens,
   f. Cover manure hauling trucks, or
   g. Do not load manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install and maintain a track-out control device,
   b. Apply and maintain pavement in high traffic areas,
   c. Apply and maintain aggregate cover,
   d. Apply and maintain synthetic particulate suppressant, or
   e. Apply and maintain water as a dust suppressant.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant, or
   i. Apply and maintain oil on roads or feed lanes.

~~G~~D. A commercial poultry facility shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. Clean fans, louvers, and soffit inlets in a commercial poultry facility~~;~~,
   b. Use no bedding~~;~~,
   c. Control vegetation on building exteriors~~;~~,
   d. Add moisture through ventilation systems~~;~~, or
   e. House in fully enclosed ventilated buildings.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,

c. Add oil and/or moisture to the feed,
d. Use enclosed feed distribution system,
e. Use flexible discharge spout,
f. Minimize drop distance,
g. Enclose transfer points,
h. Clean floors and walls in a commercial poultry facility,
i. Clean aisles between cage rows,
j. Stack separated manure solids, or
k. Maintain moisture in manure solids.

3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system, or
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water, or
   h. Apply and maintain oil on roads or feed lanes.

~~H~~E. A commercial swine facility shall implement the following best management practices, as described in subsection (~~C~~A) ~~or (D)~~, from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. House in fully enclosed ventilated buildings~~;~~,
   b. Use no bedding~~;~~,
   c. Use a slatted floor system~~;~~,
   d. Use sloped concrete flooring~~;~~,
   e. Clean fans, louvers, and soffit inlets in a commercial swine facility~~;~~,
   f. Control vegetation on building exteriors~~;~~, or
   g. Add moisture through ventilation systems.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed~~;~~,
   b. Store feed~~;~~,
   c. Add oil and/or moisture to feed~~;~~,
   d. Use enclosed feed distribution system~~;~~,
   e. Use flexible discharge spout~~;~~,
   f. Minimize drop distance~~;~~,
   g. Enclose transfer points~~;~~,
   h. Clean pens, floors, and walls in a commercial swine facility~~;~~,
   i. Clean aisles between pens and stalls~~;~~,
   j. Store separated manure solids in a wind-blocked area~~;~~,
   k. Stack separated manure solids~~;~~,
   l. Maintain moisture in manure solids~~;~~, or
   m. Maintain liquid lagoon level.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system,
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water,

h. Apply and maintain oil on roads or feed lanes, or
i. Wind barrier.

~~I. Beginning March 31, 20132014, or within 90 days after the start of a new regulated agricultural activity, whichever is later, the commercial animal operator shall complete and submit a Best Management Practices Program General Permit Record Form to the Arizona Department of Agriculture. Thereafter, the commercial animal operator shall complete and submit the Best Management Practices Program General Permit Record Form by March 31st of each subsequent year. The Best Management Practices Program General Permit Record Form shall include the following information:~~

~~1. At least the required number of best management practices as described in subsection (C) or (D) that the commercial animal operator implemented during the previous calendar year;~~
~~2. At least the required number of best management practices as described in subsection (C) or (D) that the commercial animal operator intends to implement during the current calendar year;~~
~~3. The name, business address, and phone number of the commercial animal operator responsible for the preparation and implementation of the best management practices;~~
~~4. The signature of the commercial animal operator and the date the form was signed.~~

F. From and after December 31, 2015, a commercial animal operator who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial animal operator. The Best Management Practice Program General Permit Record form shall include the following information:

1. The name of the commercial animal operator, signature, and date signed,
2. The mailing address or physical address of the commercial animal operation, and
3. The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.

~~J. Beginning in Calendar Year 20142015, and no more than once every subsequent three calendar years, the Director shall provide the commercial animal operator with a Best Management Practices Program Periodic Survey. The commercial animal operator may complete and submit the survey to the Arizona Department of Agriculture. The Periodic Survey shall include the following information:~~

~~1. The number of animals in a commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;~~
~~2. The total miles of unpaved roads at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility; and~~
~~3. The total acreage of the unpaved access connections and equipment areas at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility.~~

~~K~~G. Beginning ~~March 31, 2013~~January 1, 2016, a commercial animal operator shall maintain records demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice and any changes to the best management practices. ~~identified in the most recently submitted Best Management Practices Program General Permit Record Form.~~ Records shall be kept by the commercial animal operator onsite and made available for review by the Director within two business days of notice to the commercial animal operator. ~~A commercial animal operator shall maintain a record demonstrating compliance with this Section for three years.~~

~~L~~H. A person may develop different practices not contained in subsection (B), (~~E~~C), (~~F~~D), or (~~G~~E), ~~or (H)~~ that reduce PM_{10} and may submit such practices that are proven effective through on-~~farm~~ operation demonstration trials to the Committee. The new best management practices shall not become effective unless ~~approved~~ submitted as described in A.R.S. § 49-457(L).

~~M~~I. The Director shall not assess a fee to a commercial animal operator for coverage under the agricultural PM_{10} general permit.

~~N~~J. A commercial animal operator shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

~~O~~K. The Director shall document noncompliance with this Section before issuing a compliance order.

~~P~~L. A commercial animal operator who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-611.02. Agricultural PM General Permit for Animal Operations; Moderate PM Nonattainment Areas Designated After June 1, 2009, Except Pinal County PM Nonattainment Area

A. A commercial animal operator within a Moderate PM Nonattainment Area, designated after June 1, 2009, shall implement at least one best management practice from each category to reduce PM emissions.

B. A commercial dairy operation shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Use free stall housing,
   b. Provide shade in corral,
   c. Provide cooling in corral,
   d. Cement cattle walkways to milk barn,
   e. Groom manure surface,
   f. Water misting systems,

g. Use drag equipment to maintain pens,
h. Pile manure between cleanings,
i. Feed green chop,
j. Keep calves in barns or hutches,
k. Do not run cattle,
l. Apply a fibrous layer, or
m. Wind barrier.

2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to dairy cattle,
   b. Store and maintain feed stock,
   c. Covers for silage,
   d. Store silage in bunkers,
   e. Cover manure hauling trucks, or
   f. Do not load manure trucks with dry manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install signage to limit vehicle speed to 15 mph,
   b. Install speed control devices,
   c. Restrict access to through traffic,
   d. Install and maintain a track-out control device,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant, or
   h. Apply and maintain water as a dust suppressant.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant,
   i. Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks, or
   j. Apply and maintain pavement or cement feed lanes.

C. A commercial beef cattle feedlot shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens:
   a. Concrete aprons,
   b. Provide shade in corral,
   c. Add moisture to pen surface,
   d. Manure removal,
   e. Pile manure between cleanings,
   f. Feed higher moisture feed to beef cattle,
   g. Control cattle during movements,
   h. Use drag equipment to maintain pens,
   i. Apply a fibrous layer, or
   j. Wind barrier.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Feed higher moisture feed to beef cattle,
   b. Add molasses or tallow to feed,
   c. Store and maintain feed stock,
   d. Bulk materials,
   e. Use drag equipment to maintain pens,
   f. Cover manure hauling trucks, or
   g. Do not load manure when wind exceeds 15 mph.
3. Unpaved Access Connections:
   a. Install and maintain a track-out control device,
   b. Apply and maintain pavement in high traffic areas,
   c. Apply and maintain aggregate cover,
   d. Apply and maintain synthetic particulate suppressant, or

e. Apply and maintain water as a dust suppressant.

4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant, or
   i. Apply and maintain oil on roads or feed lanes.

D. A commercial poultry facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. Clean fans, louvers, and soffit inlets in a commercial poultry facility,
   b. Use no bedding,
   c. Control vegetation on building exteriors;
   d. Add moisture through ventilation systems, or
   e. House in fully enclosed ventilated buildings.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to the feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,
   f. Minimize drop distance,
   g. Enclose transfer points,
   h. Clean floors and walls in a commercial poultry facility,
   i. Clean aisles between cage rows,
   j. Stack separated manure solids, or
   k. Maintain moisture in manure solids.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system, or
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water, or
   h. Apply and maintain oil on roads or feed lanes.

E. A commercial swine facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. House in fully enclosed ventilated buildings,
   b. Use no bedding,
   c. Use a slatted floor system,
   d. Use sloped concrete flooring,
   e. Clean fans, louvers, and soffit inlets in a commercial swine facility,
   f. Control vegetation on building exteriors, or
   g. Add moisture through ventilation systems.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,

f. Minimize drop distance,
g. Enclose transfer points,
h. Clean pens, floors, and walls in a commercial swine facility,
i. Clean aisles between pens and stalls,
j. Store separated manure solids in a wind-blocked area,
k. Stack separated manure solids,
l. Maintain moisture in manure solids, or
m. Maintain liquid lagoon level.

3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system,
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water,
   h. Apply and maintain oil on roads or feed lanes, or
   i. Wind barrier.

E. From and after December 31, 2015, a commercial animal operator who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial animal operator. The Best Management Practices Program General Permit Record Form shall include the following information:
   1. The name of the commercial animal operator, signature, and date signed,
   2. The mailing address or physical address of the commercial animal operation, and
   3. The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.

G. Beginning January 1, 2016, a commercial animal operator shall maintain records demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice and any changes to the best management practices. Records shall be kept by the commercial animal operator onsite and made available for review by the Director within two business days of notice to the commercial animal operator.

H. A person may develop different practices not contained in subsection (B), (C), (D), or (F) that reduce PM and may submit such practices that are proven effective through on-operation demonstration trials to the Committee. The new best management practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

I. The Director shall not assess a fee to a commercial animal operator for coverage under the agricultural PM general permit.

J. A commercial animal operator shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

K. The Director shall document noncompliance with this Section before issuing a compliance order.

~~L. A commercial animal operator who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).~~

R18-2-611.03. Agricultural PM General Permit for Animal Operations: Pinal County PM Nonattainment Area

A. A commercial animal operator within the Pinal County PM Nonattainment Area shall implement at least one best management practice from each category to reduce PM emissions.

B. In addition to subsection (A), on the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast, commercial dairy operations within the Pinal County PM Nonattainment Area shall apply and maintain one of the four following BMPs on unpaved roads that experience more than 20 VDT from 2 or more axle vehicles:
   1. Apply and maintain pavement in high traffic areas,
   2. Apply and maintain aggregate cover,
   3. Apply and maintain synthetic particulate suppressant, or
   4. Apply and maintain water as a dust suppressant.

C. In addition to subsection (A), commercial beef feedlots within the Pinal County PM Nonattainment Area, shall add water to pen surface, as defined in R18-2-611(3)(a), on the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast.

D. A commercial dairy operation shall implement the following best management practices, as described in subsection (A), from each of the following categories:
   1. Arenas, Corrals, and Pens:

a. Use free stall housing,
b. Provide shade in corral,
c. Provide cooling in corral,
d. Cement cattle walkways to milk barn,
e. Groom manure surface,
f. Water misting systems,
g. Use drag equipment to maintain pens,
h. Pile manure between cleanings,
i. Feed green chop,
j. Keep calves in barns or hutches,
k. Do not run cattle,
l. Apply a fibrous layer, or
m. Wind barrier.

2. Animal Waste (and Feed) Handling and Transporting:
a. Feed higher moisture feed to dairy cattle,
b. Store and maintain feed stock,
c. Covers for silage,
d. Store silage in bunkers,
e. Cover manure hauling trucks, or
f. Do not load manure trucks with dry manure when wind exceeds 15 mph.

3. Unpaved Access Connections:
a. Install signage to limit vehicle speed to 15 mph,
b. Install speed control devices,
c. Restrict access to through traffic,
d. Install and maintain a track-out control device,
e. Apply and maintain pavement in high traffic areas,
f. Apply and maintain aggregate cover,
g. Apply and maintain synthetic particulate suppressant, or
h. Apply and maintain water as a dust suppressant.

4. Unpaved Roads or Feed Lanes:
a. Install engine speed governors on feed truck to 15 mph,
b. Install signage to limit vehicle speed to 15 mph,
c. Install speed control devices,
d. Restrict access to through traffic,
e. Apply and maintain pavement in high traffic areas,
f. Apply and maintain aggregate cover,
g. Apply and maintain synthetic particulate suppressant,
h. Apply and maintain water as a dust suppressant,
i. Use appropriate vehicles such as electric carts or small utility vehicles instead of trucks, or
j. Apply and maintain pavement or cement feed lanes.

E. A commercial beef cattle feedlot shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens:
a. Concrete aprons,
b. Provide shade in corral,
c. Add water to pen surface,
d. Manure removal,
e. Pile manure between cleanings,
f. Feed higher moisture feed to beef cattle,
g. Control cattle during movements,
h. Use drag equipment to maintain pens,
i. Apply a fibrous layer, or
j. Wind barrier.

2. Animal Waste (and Feed) Handling and Transporting:
a. Feed higher moisture feed to beef cattle;
b. Add molasses or tallow to feed,
c. Store and maintain feed stock,
d. Bulk materials,
e. Use drag equipment to maintain pens,
f. Cover manure hauling trucks, or

g. Do not load manure when wind exceeds 15 mph.

3. Unpaved Access Connections:
   a. Install and maintain a track-out control device,
   b. Apply and maintain pavement in high traffic areas,
   c. Apply and maintain aggregate cover,
   d. Apply and maintain synthetic particulate suppressant, or
   e. Apply and maintain water as a dust suppressant.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed truck to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict access to through traffic,
   e. Apply and maintain pavement in high traffic areas,
   f. Apply and maintain aggregate cover,
   g. Apply and maintain synthetic particulate suppressant,
   h. Apply and maintain water as a dust suppressant, or
   i. Apply and maintain oil on roads or feed lanes.

E. A commercial poultry facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. Clean fans, louvers, and soffit inlets in a commercial poultry facility,
   b. Use no bedding,
   c. Control vegetation on building exteriors,
   d. Add moisture through ventilation systems, or
   e. House in fully enclosed ventilated buildings.
2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to the feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,
   f. Minimize drop distance,
   g. Enclose transfer points,
   h. Clean floors and walls in a commercial poultry facility,
   i. Clean aisles between cage rows,
   j. Stack separated manure solids, or
   k. Maintain moisture in manure solids.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system, or
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water, or
   h. Apply and maintain oil on roads or feed lanes.

G. A commercial swine facility shall implement the following best management practices, as described in subsection (A), from each of the following categories:

1. Arenas, Corrals, and Pens (Housing):
   a. House in fully enclosed ventilated buildings,
   b. Use no bedding,
   c. Use a slatted floor system,
   d. Use sloped concrete flooring,
   e. Clean fans, louvers, and soffit inlets in a commercial swine facility,
   f. Control vegetation on building exteriors, or
   g. Add moisture through ventilation systems,

2. Animal Waste (and Feed) Handling and Transporting:
   a. Remove spilled feed,
   b. Store feed,
   c. Add oil and/or moisture to feed,
   d. Use enclosed feed distribution system,
   e. Use flexible discharge spout,
   f. Minimize drop distance,
   g. Enclose transfer points,
   h. Clean pens, floors, and walls in a commercial swine facility,
   i. Clean aisles between pens and stalls,
   j. Store separated manure solids in a wind-blocked area,
   k. Stack separated manure solids,
   l. Maintain moisture in manure solids, or
   m. Maintain liquid lagoon level.
3. Unpaved Access Connections:
   a. Install speed control devices,
   b. Restrict traffic access,
   c. Install and maintain a track-out control system,
   d. Install signage to limit vehicle speed to 15 mph.
4. Unpaved Roads or Feed Lanes:
   a. Install engine speed governors on feed trucks to 15 mph,
   b. Install signage to limit vehicle speed to 15 mph,
   c. Install speed control devices,
   d. Restrict traffic access,
   e. Apply and maintain aggregate cover,
   f. Apply and maintain synthetic particulate suppressant,
   g. Apply and maintain water,
   h. Apply and maintain oil on roads or feed lanes, or
   i. Wind barrier.

H. From and after December 31, 2015, a commercial animal operator who engages in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the commercial animal operator. The Best Management Practices Program General Permit Record Form shall include the following information:
1. The name of the commercial animal operator, signature, and date signed,
2. The mailing address or physical address of the commercial animal operation, and
3. The best management practices selected for Arenas, Corrals, and Pens, Animal Waste Handling and Transporting, Unpaved Access Connections, and Unpaved Roads or Feed Lanes.

I. Beginning in calendar year 2017, and no more than once every subsequent three calendar years, the Director shall provide the commercial animal operator with a Best Management Practices Program 3-year Survey. The commercial animal operator shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA) by January 31, 2018, and every three years thereafter. The Survey information submitted to the ADA shall be compiled by the ADA in a format that does not refer to a commercial animal operator's name, shall aggregate the data from the Surveys received, and be submitted to the Department. The 3-year Survey shall include the following information:
1. The name, business address, and phone number of the commercial farmer responsible for the preparation and implementation of the best management practices;
2. The signature of the commercial farmer and the date the form was signed;
3. The number of animals in a commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;
4. The total miles of unpaved roads at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;
5. The total acreage of the unpaved access connections and equipment areas at the commercial dairy operation, beef cattle feed lot, poultry facility or swine facility;
6. The best management practices selected for each category; and
7. For commercial dairy operations and beef cattle feedlots, an acknowledgement that water was applied on the day of a high risk day as predicted by the Pinal County Dust Control Forecast.

J. Beginning January 1, 2016, a commercial animal operator shall maintain records demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice and any changes to the best management practices. Records shall be kept by the commercial animal operator onsite and made available for review by the Director within two business days of notice to the commercial animal operator.

K. A person may develop different practices not contained in subsection (D), (E), (F), or (G) that reduce PM and may sub-

mit such practices that are proven effective through on-operation demonstration trials to the Committee. The new best management practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

L. The Director shall not assess a fee to a commercial animal operator for coverage under the agricultural PM general permit.

M. A commercial animal operator shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

N. The Director shall document noncompliance with this Section before issuing a compliance order.

O. A commercial animal operator who is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

R18-2-612. Definitions for ~~R18-2-613~~ R18-2-612.01

~~1. "Access restriction" means restricting or eliminating public access to noncropland with signs or physical obstruction.~~

~~2. "Aggregate cover" means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.~~

~~3. "Artificial wind barrier" means a physical barrier to the wind.~~

~~4. "Bed row spacing" means increasing or decreasing the size of a planting bed area to reduce the number of passes and soil disturbance by increasing plant density.~~

~~5. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.~~

~~6. "Chemical irrigation" means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.~~

~~7. "Combining tractor operations" means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.~~

~~8. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Yuma PM_{10} nonattainment area.~~

~~9. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.~~

~~10. "Conservation irrigation" means the use of drips, sprinklers, or underground lines to conserve water, and to reduce the weed population, the need for tillage, and soil compaction.~~

~~11. "Conservation tillage" means types of tillage that reduce the number of passes and the amount of soil disturbance.~~

~~12. "Cover crop" means plants or a green manure crop grown for seasonal soil protection or soil improvement.~~

~~13. "Critical area planting" means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.~~

~~14. "Cropland" means land on a commercial farm that:~~

~~a. Is within the time-frame of final harvest to plant emergence;~~

~~b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or~~

~~c. Is a turn-row.~~

~~15. "Cross-wind ridges" means soil ridges formed by a tillage operation.~~

~~16. "Cross-wind strip-cropping" means planting strips of alternating crops within the same field.~~

~~17. "Cross-wind vegetative strips" means herbaceous cover established in one or more strips within the same field.~~

~~18. "Equipment modification" means modifying agricultural equipment to prevent or reduce particulate matter generation from cropland.~~

~~19. "Limited activity during a high-wind event" means performing no tillage or soil preparation activity when the measured wind speed at six feet in height is more than 25 mph at the commercial farm site.~~

~~20. "Manure application" means applying animal waste or biosolids to a soil surface.~~

~~21. "Mulching" means applying plant residue or other material that is not produced onsite to a soil surface.~~

~~22. "Multi-year crop" means a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.~~

~~23. "Night farming" means performing regulated agricultural activities at night when moisture levels are higher and winds are lighter.~~

~~24. "Noncropland" means any commercial farmland that:~~

~~a. Is no longer used for agricultural production;~~

~~b. Is no longer suitable for production of crops;~~

~~c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or~~

~~d. Includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head.~~

~~25. "Permanent cover" means a perennial vegetative cover on cropland.~~

~~26. "Planting based on soil moisture" means applying water to soil before performing planting operations.~~

~~27. "Precision farming" means use of satellite navigation to calculate position in the field, to reduce overlap during field operations, and allow operations to occur during nighttime and inclement weather, thus generating less PM_{10}.~~

~~28. "Reduce vehicle speed" means operating farm vehicles or farm equipment on unpaved farm roads at speeds not to exceed 20 mph.~~

~~29. "Reduced harvest activity" means reducing the number of harvest passes using a mechanized method to cut and remove crops from a field.~~

~~30. "Regulated agricultural activity" means a commercial farming practice that may produce PM_{10} within the Yuma PM_{10} nonattainment area.~~
~~31. "Residue management" means managing the amount and distribution of crop and other plant residues on a soil surface.~~
~~32. "Sequential cropping" means growing crops in a sequence that minimizes the amount of time bare soil is exposed on a field.~~
~~33. "Surface roughening" means manipulating a soil surface to produce or maintain clods.~~
~~34. "Synthetic particulate suppressant" means a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, and polyacrylamide, an emulsion of a petroleum product, and an enzyme product that is used to control particulate matter.~~
~~35. "Tillage and harvest" means any mechanical practice that physically disturbs cropland or crops on a commercial farm.~~
~~36. "Tillage based on soil moisture" means applying water to soil before or during tillage, or delaying tillage to coincide with precipitation.~~
~~37. "Timing of a tillage operation" means performing tillage operations at a time that will minimize the soil's susceptibility to generate PM_{10}.~~
~~38. "Transgenic crops" means the use of genetically modified crops such as "herbicide ready" crops, which reduces the need for tillage or cultivation operations, and reduces soil disturbance.~~
~~39. "Track-out control system" means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road.~~
~~40. "Tree, shrub, or windbreak planting" means providing a woody vegetative barrier to the wind.~~
~~41. "Watering" means applying water to noncropland.~~
~~42. "Yuma PM_{10} nonattainment area" means the Yuma PM_{10} planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.~~

The definitions in R18-2-101 and the following definitions apply to R18-2-612.01:

1. "Access restriction" means reducing PM emission by reducing the number of trips driven on unpaved operation and maintenance and unpaved utility roads by restricting or eliminating public access by the used of signs or physical obstruction at locations that effectively control access to roads.
2. "Aggregate cover" means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads. The aggregate should be clean, hard and durable, and should be applied a depth sufficient to create soil stabilization in accordance with material specifications. A minimum depth of three inches is the standard in the absence of such specifications.
3. "Apply and maintain water" means reducing PM emissions and wind erosion by applying water to bare soil surfaces until the surfaces are visibly moist.
4. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM emissions from a regulated agricultural activity.
5. "Biological control of aquatic weeds" means reducing at least one trip, or to one trip if only one trip is needed, per treatment, made by vehicles for the purposes of removing aquatic weeds from canals by using fish, and other biologic means, within the canal through the use of to control the growth of aquatic weeds that reduce operating capacities and create debris that causes other operational issues.
6. "Canals" means facilities constructed for the sole purpose of the control, conveyance, and delivery of water. These facilities may be either open earthen channels, lined or unlined, or buried pipelines, which are used to convey water uphill and under obstructions, such as roadways and wash and river channels. These facilities include, but are not limited to, gate, inlet, outlet, safety, and measuring structures required to control water along the canals and deliver water to irrigation district customers, as well as compacted earthen banks constructed to protect these facilities from storm runoff events.
7. "Committee" means the Governor's Agricultural Best Management Practices Committee.
8. "Debris" means trash, rubble, and other non-soil materials.
9. "Dredge canals" means reducing PM emissions by mechanically removing muck, debris, and other foreign objects from canals while material is still wet or damp.
10. "Dust Control Forecast" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the department shall consider all of the following:
    a. Projected meteorological conditions, including:
        i. Wind speed and direction,
        ii. Stagnation,
        iii. Recent precipitation, and
        iv. Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and

c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

11. "Earth materials" means natural materials covering the ground surface, which includes, but are not limited to, dirt, rocks, or soil.
12. "Grading roadways" means mechanically smoothing and compacting the roadway surface.
13. "Irrigation District" means a political subdivision, governed by title 48, chapter 19.
14. "Limit activity" means performing only critical operational or emergency activity on a day forecast to be high risk for dust generation as forecasted by the Pinal County Dust Control Forecast.
15. "Major earth moving activities" means the mechanical movement of earth materials to reconstruct, relocate, reshape, reconfigure canals, including operation and maintenance roads and utility access roads.
16. "Maricopa PM nonattainment area" means the Phoenix planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.
17. "Minor earth moving activities" means the mechanical movement of earth materials to repair and maintain the existing configuration, location, bank slopes, or inclines of canals.
18. "Muck" means water that is saturated with mud, dirt, and soil, which accumulates over time along the bottom of canals.
19. "Paved Public Road" means any paved roadways that are open to public travel and maintained by a City, County, or the State.
20. "Pinal County PM Nonattainment Area" means the West Pinal PM_{10} planning area and the West Central $PM_{2.5}$ planning area, as defined in 40 CFR 81.303, and incorporated by reference in R18-2-210.
21. "PM" includes both particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53; and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method contained within 40 CFR 50 Appendix J or by an equivalent method designated in accordance with 40 CFR 53, as incorporated by reference in Appendix 2.
22. "Reduce vehicle speed" means reducing PM emissions and soil erosion from the use of vehicles owned or operated by the irrigation district on unpaved operation, maintenance, and utility access roads, at speeds not to exceed 25 mph. This can be achieved through worker behavior modifications, signage, or any other necessary means.
23. "Regulated agricultural activity" means activities of an irrigation district, which affects those lands and facilities that are under the jurisdiction and control of an irrigation district, as described in § 49-457(P)(1)(f) and A.R.S. § 49-457(P)(5)(b).
24. "Regulated area" means a regulated area as defined in A.R.S. § 49-457(P)(6)(c).
25. "Sediment" means muck that has dried after removal from canals.
26. "Supervisory control system" means a system that allows the irrigation district to control operational structures from a remote computer location in order to reduce at least one trip made by vehicles to access structures for operational purposes.
27. "Synthetic or natural particulate suppressant" means reducing PM emissions and wind erosion by providing a stabilized soil surface with organic material, such as muck, animal waste or biosolids, or with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of a petroleum product, an enzyme product, or polyacrylamide.
28. "Track-out control system" means minimizing any and all material that adheres to and agglomerates on all vehicles and equipment and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.
29. "Unauthorized use" means any travel or access by non-district personnel in non-district vehicles along roadways under the control of an irrigation district without the permission of the irrigation district.
30. "Unpaved operation and maintenance roads" means unpaved roadways that lay adjacent to canals, which provide access for irrigation district personnel and equipment for direct operation and maintenance of canals, and are under the control of the irrigation district.
31. "Unpaved utility access roads" means unpaved roadways used to provide access to canals, and also includes office and shop facilities, equipment yards, staging areas and other lands under the control of the irrigation district.
32. "Weed management" means reducing at least one trip made by vehicles for the purposes of removing weeds by using a combination of techniques, including organic, chemical, or biological means, to control weeds along canal banks and land surfaces not used for conveying water, excluding unpaved roadways.
33. "Wind barrier" means reducing PM_{10} emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50% and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For

vegetative barriers, compliance shall be determined by NRCS Conservation Practice Standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

R18-2-612.01. Agricultural PM General Permit For Irrigation Districts; PM Nonattainment Areas Designated After June 1, 2009

A. An irrigation district within a PM Nonattainment Area, designated after June 1, 2009, shall implement at least one best management practice from each of the following categories to reduce PM emissions:
   1. Unpaved operation and maintenance roads:
      a. Access restriction,
      b. Apply and maintain aggregate cover,
      c. Install supervisory control system to limit vehicle travel,
      d. Limit activity,
      e. Install signage to limit vehicle speed to 25 mph,
      f. Post warning signs for unauthorized use at point of entry to roads,
      g. Reduce vehicle speed,
      h. Install and maintain a track-out control system,
      i. Apply and maintain synthetic or natural particulate suppressant,
      j. Apply and maintain water before, during, and after major and minor earth moving activities,
      k. Apply and maintain water when grading roadways,
      l. Use paved non-district or paved public roads to access structures, or
      m. Install wind barriers.
   2. Canals:
      a. Dredge canals while muck or debris is still wet,
      b. Dispose of muck or debris while still damp,
      c. Weed management,
      d. Biological control of aquatic weeds, or
      e. Apply and maintain water before, during and after major and minor earth moving activities.
   3. Unpaved utility access roads:
      a. Access restriction,
      b. Apply and maintain aggregate cover,
      c. Limit activity,
      d. Install signage to limit vehicle speed to 25 mph,
      e. Post warning signs for unauthorized use at points of entry to roads,
      f. Reduce vehicle speed,
      g. Install and maintain a track-out control system,
      h. Apply and maintain pavement,
      i. Apply and maintain synthetic or natural particulate suppressant,
      j. Apply and maintain water before, during and after major and minor earth moving activities,
      k. Apply and maintain water when grading roadways,
      l. Use paved non-district or paved public roads to access structures, or
      m. Install wind barriers.

B. From and after December 31, 2015, an irrigation district engaged in a regulated agricultural activity shall complete a Best Management Practices Program General Permit Record Form. Thereafter, a new Best Management Practices Program General Permit Record Form shall be completed every year by March 31. The Form shall be provided to the Director within two business days of notice to the irrigation district. The Best Management Practice Program General Permit Record form shall include the following information:
   1. The name, business address, and of the of the irrigation district representative responsible for the preparation and implementation of the best management practices;
   2. The signature of the irrigation district representative and the date the form was signed; and
   3. The best management practice selected for unpaved operation and utility roads, canals, and unpaved utility access roads.

C. Beginning in calendar year 2017, and no more than once every subsequent three calendar years, the Director, in conjunction with the Arizona Department of Agriculture, shall provide the irrigation district with a Best Management Practices Program 3-year Survey. The irrigation district shall complete the Survey with data from the preceding calendar year and submit the Survey to the Arizona Department of Agriculture (ADA) by January 31, 2018, and every three years thereafter. The Survey information submitted to the ADA shall be compiled by the ADA then be submitted to the Department. The 3-year Survey shall include the following information:
   1. The name, business address, and phone number of the irrigation district representative responsible for the preparation and implementation of the best management practices;
   2. The signature of the irrigation district representative and the date the form was signed;
   3. The total miles of canals that the irrigation district controls;
   4. The total miles of unpaved operation and maintenance roads;

5. The total miles of the unpaved utility access roads; and
6. The best management practices selected for unpaved operation and utility roads, canals, and unpaved utility access roads.

D. Records of any changes to those Best Management Practices shall be noted on the Best Management Practices Program General Permit Record Form and shall be kept by the irrigation district onsite and made available for review by the Director within two business days of notice to the irrigation district by the Department.

E. An irrigation district may develop different practices not contained in either of the categories of subsection (A)(1), (A)(2), or (A)(3) that reduce PM and may submit such practices that are proven effective through in-district trials. The proposed new practices shall not become effective unless submitted as described in A.R.S. § 49-457(L).

F. An irrigation district shall maintain a record demonstrating compliance with this Section for three years. Records shall include a copy of the complete Best Management Practice Program General Permit Record Form to confirm implementation of each best management practice.

G. The Director shall not assess a fee to an irrigation district for coverage under the agricultural PM general permit.

H. An irrigation district shall ensure that the implementation of all selected best management practices does not violate any other local, state, or federal law.

I. The Director shall document noncompliance with this Section before issuing a compliance order.

J. An irrigation district that is not in compliance with this Section is subject to the provisions in A.R.S. § 49-457(I), (J), and (K).

~~R18-2-613. Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices~~ ~~Definitions for R18-2-613.01~~

~~A. A commercial farmer shall comply with this Section by August 1, 2005.~~

~~B. A commercial farmer who begins a regulated agricultural activity after August 1, 2005, shall comply with this Section within 60 days after beginning the regulated agricultural activity.~~

~~C. A commercial farmer shall implement at least one of the best management practices from each of the following categories at each commercial farm:~~

~~1. Tillage and harvest, subsection (E);~~
~~2. Noncropland, subsection (F); and~~
~~3. Cropland, subsection (G).~~

~~D. A commercial farmer shall ensure that the implementation of each selected best management practice does not violate any other local, state, or federal law.~~

~~E. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from tillage and harvest:~~

~~1. Bed row spacing;~~
~~2. Chemical irrigation;~~
~~3. Combining tractor operations;~~
~~4. Conservation irrigation;~~
~~5. Conservation tillage;~~
~~6. Equipment modification;~~
~~7. Limited activity during a high-wind event;~~
~~8. Multi-year crop;~~
~~9. Night farming;~~
~~10. Planting based on soil moisture;~~
~~11. Precision farming;~~
~~12. Reduced harvest activity;~~
~~13. Tillage based on soil moisture;~~
~~14. Timing of a tillage operation, or~~
~~15. Transgenic crops.~~

~~F. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from noncropland:~~

~~1. Access restriction;~~
~~2. Aggregate cover;~~
~~3. Artificial wind barrier;~~
~~4. Critical area planting;~~
~~5. Manure application;~~
~~6. Reduce vehicle speed;~~
~~7. Synthetic particulate suppressant;~~
~~8. Track-out control system;~~
~~9. Tree, shrub, or windbreak planting; or~~
~~10. Watering.~~

~~G. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from cropland:~~

~~1. Artificial wind barrier;~~

~~2. Cover crop;~~
~~3. Cross-wind ridges;~~
~~4. Cross-wind strip-cropping;~~
~~5. Cross-wind vegetative strips;~~
~~6. Manure application;~~
~~7. Mulching;~~
~~8. Multi-year crop;~~
~~9. Permanent cover;~~
~~10. Planting based on soil moisture;~~
~~11. Precision farming;~~
~~12. Residue management;~~
~~13. Sequential cropping;~~
~~14. Surface roughening; or~~
~~15. Tree, shrub, or windbreak planting.~~

~~H. A person may develop different practices not contained in subsections (E), (F), or (G) that reduce PM_{10}. A person may submit practices that are proven effective through on-farm demonstration trials to the Director. The Director shall review the submitted practices.~~

~~I. A commercial farmer shall maintain records demonstrating compliance with this Section. The commercial farmer shall provide the records to the Director within two business days of written notice to the commercial farmer. The records shall contain:~~

~~1. The name of the commercial farmer,~~
~~2. The mailing address or physical location of the commercial farm, and~~
~~3. The best management practices selected for tillage and harvest, noncropland, and cropland by the commercial farmer, and the date each best management practice was implemented.~~

1. "Access restriction" means restricting or eliminating public access to noncropland with signs or physical obstruction.
2. "Aggregate cover" means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.
3. "Artificial wind barrier" means a physical barrier to the wind.
4. "Bed row spacing" means increasing or decreasing the size of a planting bed area to reduce the number of passes and soil disturbance by increasing plant density.
5. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.
6. "Chemical irrigation" means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.
7. "Combining tractor operations" means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.
8. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Yuma PM_{10} nonattainment area.
9. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.
10. "Conservation irrigation" means the use of drips, sprinklers, or underground lines to conserve water, and to reduce the weed population, the need for tillage, and soil compaction.
11. "Conservation tillage" means types of tillage that reduce the number of passes and the amount of soil disturbance.
12. "Cover crop" means plants or a green manure crop grown for seasonal soil protection or soil improvement.
13. "Critical area planting" means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.
14. "Cropland" means land on a commercial farm that:
    a. Is within the time-frame of final harvest to plant emergence;
    b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
    c. Is a turn-row.
15. "Cross-wind ridges" means soil ridges formed by a tillage operation.
16. "Cross-wind strip-cropping" means planting strips of alternating crops within the same field.
17. "Cross-wind vegetative strips" means herbaceous cover established in one or more strips within the same field.
18. "Equipment modification" means modifying agricultural equipment to prevent or reduce particulate matter generation from cropland.
19. "Limited activity during a high-wind event" means performing no tillage or soil preparation activity when the measured wind speed at six feet in height is more than 25 mph at the commercial farm site.
20. "Manure application" means applying animal waste or biosolids to a soil surface.
21. "Mulching" means applying plant residue or other material that is not produced onsite to a soil surface.
22. "Multi-year crop" means a crop, pasture, or orchard that is grown, or will be grown, on a continuous basis for more than one year.

23. "Night farming" means performing regulated agricultural activities at night when moisture levels are higher and winds are lighter.
24. "Noncropland" means any commercial farmland that:
    a. Is no longer used for agricultural production;
    b. Is no longer suitable for production of crops;
    c. Is subject to a restrictive easement or contract that prohibits use for the production of crops; or
    d. Includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head.
25. "Permanent cover" means a perennial vegetative cover on cropland.
26. "Planting based on soil moisture" means applying water to soil before performing planting operations.
27. "Precision farming" means use of satellite navigation to calculate position in the field, to reduce overlap during field operations, and allow operations to occur during nighttime and inclement weather, thus generating less PM_{10}.
28. "Reduce vehicle speed" means operating farm vehicles or farm equipment on unpaved farm roads at speeds not to exceed 20 mph.
29. "Reduced harvest activity" means reducing the number of harvest passes using a mechanized method to cut and remove crops from a field.
30. "Regulated agricultural activity" means a commercial farming practice that may produce PM_{10} within the Yuma PM_{10} nonattainment area.
31. "Residue management" means managing the amount and distribution of crop and other plant residues on a soil surface.
32. "Sequential cropping" means growing crops in a sequence that minimizes the amount of time bare soil is exposed on a field.
33. "Surface roughening" means manipulating a soil surface to produce or maintain clods.
34. "Synthetic particulate suppressant" means a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, and polyacrylamide, an emulsion of a petroleum product, and an enzyme product that is used to control particulate matter.
35. "Tillage and harvest" means any mechanical practice that physically disturbs cropland or crops on a commercial farm.
36. "Tillage based on soil moisture" means applying water to soil before or during tillage, or delaying tillage to coincide with precipitation.
37. "Timing of a tillage operation" means performing tillage operations at a time that will minimize the soil's susceptibility to generate PM_{10}.
38. "Transgenic crops" means the use of genetically modified crops such as "herbicide ready" crops, which reduces the need for tillage or cultivation operations, and reduces soil disturbance.
39. "Track-out control system" means a device to remove mud or soil from a vehicle before the vehicle enters a paved public road.
40. "Tree, shrub, or windbreak planting" means providing a woody vegetative barrier to the wind.
41. "Watering" means applying water to noncropland.
42. "Yuma PM_{10} nonattainment area" means the Yuma PM_{10} planning area as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210.

R18-2-613.01. ~~Yuma PM_{10} Nonattainment Area; Agricultural Best Management Practices~~

A. A commercial farmer shall comply with this Section by August 1, 2005.
B. A commercial farmer who begins a regulated agricultural activity after August 1, 2005, shall comply with this Section within 60 days after beginning the regulated agricultural activity.
C. A commercial farmer shall implement at least one of the best management practices from each of the following categories at each commercial farm:
    1. Tillage and harvest, subsection (E);
    2. Noncropland, subsection (F); and
    3. Cropland, subsection (G).
D. A commercial farmer shall ensure that the implementation of each selected best management practice does not violate any other local, state, or federal law.
E. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from tillage and harvest:
    1. Bed row spacing,
    2. Chemical irrigation,
    3. Combining tractor operations,
    4. Conservation irrigation,
    5. Conservation tillage,
    6. Equipment modification,
    7. Limited activity during a high-wind event,
    8. Multi-year crop,
    9. Night farming,

10. Planting based on soil moisture,
11. Precision farming,
12. Reduced harvest activity,
13. Tillage based on soil moisture,
14. Timing of a tillage operation, or
15. Transgenic crops.

F. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from noncropland:
1. Access restriction;
2. Aggregate cover;
3. Artificial wind barrier;
4. Critical area planting;
5. Manure application;
6. Reduce vehicle speed;
7. Synthetic particulate suppressant;
8. Track-out control system;
9. Tree, shrub, or windbreak planting; or
10. Watering.

G. A commercial farmer shall implement at least one of the following best management practices to reduce PM_{10} emissions from cropland:
1. Artificial wind barrier;
2. Cover crop;
3. Cross-wind ridges;
4. Cross-wind strip-cropping;
5. Cross-wind vegetative strips;
6. Manure application;
7. Mulching;
8. Multi-year crop;
9. Permanent cover;
10. Planting based on soil moisture;
11. Precision farming;
12. Residue management;
13. Sequential cropping;
14. Surface roughening; or
15. Tree, shrub, or windbreak planting.

H. A person may develop different practices not contained in subsections (E), (F), or (G) that reduce PM_{10}. A person may submit practices that are proven effective through demonstration trials to the Director. The Director shall review the submitted practices.

I. A commercial farmer shall maintain records demonstrating compliance with this Section. The commercial farmer shall provide the records to the Director within two business days of written notice to the commercial farmer. The records shall contain:
1. The name of the commercial farmer,
2. The mailing address or physical location of the commercial farm, and
3. ~~The best management practices selected for tillage and harvest, noncropland, and cropland by the commercial farmer, and the date each best management practice was implemented.~~

APPENDIX 2. TEST METHODS AND PROTOCOLS

The following test methods and protocols are approved for use as directed by the Department under this Chapter. These standards are incorporated by reference as applicable requirements revised as of July 1, 2006, and no future editions or amendments. These standards are on file with the Department, and are also available from the U.S. Government Printing Office, Superintendent of Documents, bookstore.gpo.gov, Mail Stop: SSOP IDCC-SSOM, Washington, D.C. 20402-9328.

~~1.~~A. 40 CFR 50;
~~2.~~B. 40 CFR 50, Appendices A through N;
~~3.~~C. 40 CFR 51, Appendix M, Section IV of Appendix S, and Appendix W;
~~4.~~D. 40 CFR 52, Appendices D and E;
~~5.~~E. 40 CFR 53;
~~6.~~F. 40 CFR 58;
~~7.~~G. 40 CFR 58, all appendices;
~~8.~~H. 40 CFR 60, all appendices;
~~9.~~I. 40 CFR 61, all appendices;
~~10.~~J. 40 CFR 63, all appendices;
~~11.~~K. 40 CFR 75, all appendices.

L. 40 CFR 51.128, Appendix A(1)(B).

M. Silt Content Test Method. The purpose of this test method is to estimate the silt content of the trafficked parts of commercial farm roads, as defined in R18-2-610. The higher the silt content, the more fine dust particles that are released when cars and trucks drive on commercial farm roads.

1. Equipment:
   a. A set of sieves with the following openings: 4 millimeters (mm), 2mm, 1 mm, 0.5 mm and 0.25 mm and a lid and collector pan
   b. A small whisk broom or paintbrush with stiff bristles and dustpan 1 ft. in width. (The broom/brush should preferably have one, thin row of bristles no longer than 1.5 inches in length.)
   c. A spatula without holes A small scale with half ounce increments (e.g. postal/package scale)
   d. A shallow, lightweight container (e.g. plastic storage container)
   e. A sturdy cardboard box or other rigid object with a level surface
   f. Basic calculator
   g. Cloth gloves (optional for handling metal sieves on hot, sunny days)
   h. Sealable plastic bags (if sending samples to a laboratory)
   i. Pencil/pen and paper
2. Step 1: Look for a routinely-traveled surface, as evidenced by tire tracks. [Only collect samples from surfaces that are not wet or damp due to precipitation, dew or watering.] Use caution when taking samples to ensure personal safety with respect to passing vehicles. Gently press the edge of a dustpan (1 foot in width) into the surface four times to mark an area that is 1 square foot. Collect a sample of loose surface material using a whisk broom or brush and slowly sweep the material into the dustpan, minimizing escape of dust particles. Use a spatula to lift heavier elements such as gravel. Only collect dirt/gravel to an approximate depth of 3/8 inch or 1 cm in the 1 square foot area. If you reach a hard, underlying subsurface that is < 3/8 inch in depth, do not continue collecting the sample by digging into the hard surface. In other words, you are only collecting a surface sample of loose material down to 1 cm. In order to confirm that samples are collected to 1 cm. in depth, a wooden dowel or other similar narrow object at least one foot in length can be laid horizontally across the survey area while a metric ruler is held perpendicular to the dowel. At this point, you can choose to place the sample collected into a plastic bag or container and take it to an independent laboratory for silt content analysis. A reference to the procedure the laboratory is required to follow is in subsection (10) below.
3. Step 2: Place a scale on a level surface. Place a lightweight container on the scale. Zero the scale with the weight of the empty container on it. Transfer the entire sample collected in the dustpan to the container, minimizing escape of dust particles. Weigh the sample and record its weight.
4. Step 3: Stack a set of sieves in order according to the size openings specified above, beginning with the largest size opening (4 mm) at the top. Place a collector pan underneath the bottom (0.25 mm) sieve.
   Step 4: Carefully pour the sample into the sieve stack, minimizing escape of dust particles by slowly brushing material into the stack with a whisk broom or brush. (On windy days, use the trunk or door of a car as a wind barricade.) Cover the stack with a lid. Lift up the sieve stack and shake it vigorously up, down and sideways for at least 1 minute.
5. Step 5: Remove the lid from the stack and disassemble each sieve separately, beginning with the top sieve. As you remove each sieve, examine it to make sure that all of the material has been sifted to the finest sieve through which it can pass; e.g. material in each sieve (besides the top sieve that captures a range of larger elements) should look the same size. If this is not the case, re-stack the sieves and collector pan, cover the stack with the lid, and shake it again for at least 1 minute. (You only need to reassemble the sieve(s) that contain material which requires further sifting.)
6. Step 6: After disassembling the sieves and collector pan, slowly sweep the material from the collector pan into the empty container originally used to collect and weigh the entire sample. Take care to minimize escape of dust particles. You do not need to do anything with material captured in the sieves -- only the collector pan. Weigh the container with the material from the collector pan and record its weight.
7. Step 7: If the source is an unpaved road, multiply the resulting weight by 0.38. If the source is an unpaved parking lot, multiply the resulting weight by 0.55. The resulting number is the estimated silt loading. Then, divide by the total weight of the sample you recorded earlier in Step 2 and multiply by 100 to estimate the percent silt content.
8. Step 8: Select another two routinely-traveled portions of the unpaved road or unpaved parking lot and repeat this test method. Once you have calculated the silt loading and percent silt content of the three samples collected, average your results together.
9. Step 9: Examine Results. If the average silt loading is less than 0.33 oz/ft&sup2, the surface is STABLE. If the average silt loading is greater than or equal to 0.33 oz/ft&sup2, then proceed to examine the average percent silt content. If the source is an unpaved road and the average percent silt content is 6% or less, the surface is STABLE. If the source is an unpaved parking lot and the average percent silt content is 8% or less, the surface is STABLE. If your field test results are within 2% of the standard (for example, 4%-8% silt content on an unpaved road), it is recommended that you collect three additional samples from the source according to Step 1 and take them to an independent laboratory for silt content analysis.

10. Independent Laboratory Analysis: You may choose to collect three samples from the source, according to Step 1, and send them to an independent laboratory for silt content analysis rather than conduct the sieve field procedure. If so, the test method the laboratory is required to use comes from the from the following text: *Procedures For Laboratory Analysis Of Surface/Bulk Dust Loading Samples*, (Fifth Edition, Volume I, Appendix C.2.3 "Silt Analysis", 1995), AP-42, Office of air Quality Planning & Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

Exhibit G-VII:

Certified Final Rule - Pinal County Construction Sites - Fugitive Dust Rule for West Pinal PM10 Nonattainment Area (Construction Rule)

MICHELE REAGAN
Secretary of State
State of Arizona

UNITED STATES OF AMERICA)
) SS.
STATE OF ARIZONA)

I, MICHELE REAGAN, SECRETARY OF STATE, DO HEREBY CERTIFY THAT THE ATTACHED IS A COMPLETE, TRUE, AND CORRECT COPY OF THE FOLLOWING PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AS PUBLISHED IN THE ARIZONA ADMINISTRATIVE REGISTER, VOLUME 21, ISSUE 47, NOVEMBER 20, 2015: 1-1-105, 4-3-160, 4-3-170, 4-3-180, AND 4-3-190.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done this 21st day of December, 2015.

Michele Reagan

MICHELE REAGAN
Secretary of State

1700 W. Washington Street, Fl. 7
Phoenix, Arizona 85007-2808
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www.azsos.gov

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING
PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-290]

1. **Preamble**

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The adopted construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity, ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the adopted rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections 160, 170, 180, 190) through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the

comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.
        b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
        c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where dust is required to test and validate the design integrity, product quality, etc.
        d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).
        e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.
        f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
        g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.
3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.
4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A – For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B – For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and

3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
   a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
   b) All dust generating operations are ceased and disturbed surface areas are stabilized.

Subsection C – Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.

1. Application form requirements.
   a) Applicant must provide essential identification on an application form approved by the control officer. Separate application forms required for non-contiguous areas, unless it's an annual block permit.
   b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.
   c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.
   d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.
   e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).
      a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application for more than one job site, though each work site has to be described in the application along with what type of dust generating operations are to be conducted.
      b. Area block applications are only available to
         i. Political subdivisions and
         ii. Public utility corporations regulated by the Arizona Corporation Commission and
         iii. Contractors or subcontractors for political subdivisions or public utility corporations
      c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.
      d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and type of dust generating operation, control measures used and start date.
2. Permit and recordkeeping requirements.
   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work site at all times dust generating operations are taking place. The permit is to reside on the work site.

b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.

c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.

d) Completion of project notification to Control Officer – no later than 30 days after completion.

e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.

f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)

·Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.

·Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:

1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:

a) All dust generating operations are ceased until the opacity violations are no longer taking place, or

b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.

2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

There are estimated small incremental costs to the businesses potentially affected by the adopted construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these adopted rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time.

The stabilization requirements of the adopted rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule adoption for water use wouldn't be additionally burdensome.

Pinal County
Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).
Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:
Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:
Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132
http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1715, August 28, 2015.
Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1716, August 28, 2015

2. The full text of the adopted changes follows:

~~**1-1-105. SIP list**~~

A. ~~As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:~~

1. ~~Chapter 1~~
   a. ~~Article 1. (As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.~~
   b. ~~Article 2. (As amended 5/14/97 and 7/12/00) except for §1-2-110.~~
   c. ~~Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")~~
2. ~~Chapter 2~~
   a. ~~Article 1. (As amended 10/12/95).~~
   b. ~~Article 2. (As amended 5/14/97).~~
   c. ~~Article 3. (As amended 10/12/95).~~
   d. ~~Article 4. (As amended 10/12/95).~~

e. Article 5. (As amended 10/12/95).
f. Article 6. (As amended 10/12/95).
g. Article 7. (As amended 10/12/95).
h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)
      ii. §4-3-170 (As amended 10/28/15)
      iii. §4-3-180 (As amended 10/28/15)
      iv. §4-3-190 (As amended 10/28/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of

Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. ~~§5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*~~
24. ~~§5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*~~

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.

Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

   This definition excludes those permanently stabilized areas that have:

   a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
   b. Been paved or otherwise covered by a permanent structure; or
   c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

   a) Earthmoving activities
   b) Land clean-up, leveling, back filling
   c) Drilling
   d) Construction
   e) Demolition
   f) Bulk material handling, storage and/or transporting operations
   g) Operation of motorized machinery used in Construction
   h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
   i) Installing initial landscapes using mechanized equipment

   For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.
9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.
11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and

c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.

20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.

21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).

22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.

23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.

24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).

25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.

26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.

27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.

    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:

        i. Trenches less than four feet in depth, that exceed a length of 726 feet;

        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;

    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.

    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:

1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.

2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:

1. Install suitable trackout control prior to the start of dust generating operations;

2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and

3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:
    a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or
    b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
    a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
    b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
    c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
    d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
    e. Annual Area Block Application:
        i. Area block applications shall only be available for dust generating operations associated with:
            a) Maintenance of existing underground or above-ground lines;
            b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
            c) Underground utility line extensions not exceeding 500' in length; and
            d) Overhead utility line extensions; and
            e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.
        ii. Area block applications shall only be available to:
            a) Political subdivisions; and
            b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
            c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations
        iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.
        iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.
        v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.
        vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the

dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:
   a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.
   b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).
   c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.
   d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project.
   e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.
   f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:
      i. Project Name
      ii. Name and phone number of person(s) responsible for conducting project
      iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:
   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

Exhibit G-VIII:

Certified Final Rule - Pinal County West Pinal PM10 Moderate Nonattainment Area Fugitive Dust Rule (Fugitive Dust Rule)

MICHELE REAGAN
Secretary of State
State of Arizona

UNITED STATES OF AMERICA)
) SS.
STATE OF ARIZONA)

I, MICHELE REAGAN, SECRETARY OF STATE, DO HEREBY CERTIFY THAT THE ATTACHED IS A COMPLETE, TRUE, AND CORRECT COPY OF THE FOLLOWING PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AS PUBLISHED IN THE ARIZONA ADMINISTRATIVE REGISTER, VOLUME 21, ISSUE 47, NOVEMBER 20, 2015: 1-1-105, 4-1-010, 4-1-015, 4-1-020, 4-1-030, 4-1-040, 4-1-045, 4-1-050, AND 4-1-060.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done this 21st day of December, 2015.

Michele Reagan

MICHELE REAGAN
Secretary of State

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COUNTY NOTICES ACCORDING TO A.R.S. § 49-112

This section of the *Arizona Administrative Register* contains County Notices (according to A.R.S. § 49-112).

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PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING

PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-289]

1. **Preamble**

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The adopted rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These adopted general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions for the aforementioned land use categories. In addition the adopted rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The Pinal County Board of Supervisors adopted the proposed additions and amendments listed in section B below at their October 28, 2015 meeting.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Amendment of Chapter 4, Article 1, §010,
   - Amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.
3. Addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:
   - Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
   - Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
   - Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
   - Dust generating operations (i.e. construction).
   - Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
4. Addition of Chapter 4, Article 1, §020 (Definitions),
   - Sixteen definitions directly related to these rules.
5. Addition of Chapter 4, Article 1, §030 (Standards)
   - Subsection 1 – General requirements
     - A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be

subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.

B. The owner and/or operator shall implement applicable control measures.

C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.

D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.

- Subsection 2 – Open areas/vacant lots
  - A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
  - B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
  - C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.
  - D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.
  - E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.
  - F. Compliance determination.
- Subsection 3 – Unpaved lots
  - A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
  - B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.
- Subsection 4 – Unpaved roads
  - A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
  - B. Control measures are considered effectively implemented when:
    - i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
      - a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
        - i. Done on unpaved roads previously untreated, and
        - ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
        - iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.
- Subsection 5 – Paved public roadway
  - A. Trackout cleanup provisions for trackout that extends 50 feet or more.
    - i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
    - ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
    - iii. Trackout cleanup extension provision

B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Addition of Chapter 4, Article 1, §050 (Records retention)

Two year records retention requirement.

8. Addition of Chapter 4, Article 1, §060 (Violations)

Violation provisions for these rules.

Violation exemptions include:

i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.

ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

Open areas/Vacant lots

There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the adopted 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the adopted 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The adopted rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to the surface area disturbed prior to, during and after the weed abatement. The adopted rules include additional trackout requirements associated with weed abatement activities. All of these new adopted restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold adopted (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the adopted rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection

4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road is $100,000 per mile. Assuming the 15 miles per year requirement in §4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the adopted rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The adopted rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987

Florence, AZ. 85132
http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the adopted rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1730, August 28, 2015.
Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1731, August, 28, 2015

2. The full text of the adopted changes follows:

~~**1-1-105. SIP list**~~

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:

1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:

1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. ~~§5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*~~
24. ~~§5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*~~

ARTICLE 1. ~~ADOPTED DOCUMENTS~~

WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C., Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES – as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY – as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE – As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
   a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
   b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
   c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
       i) Wind speed and direction,
       ii) Stagnation,
       iii) Recent precipitation, and
       iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and

storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. GENERAL REQUIREMENTS

A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.

B. The owner and/or operator shall implement applicable control measures.

C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.

D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. OPEN AREAS/VACANT LOTS

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:

i. No trespassing signs

ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

i. Apply and maintain water or dust suppressants; or

ii. Establish vegetation; or

iii. Install and maintain pavement; or

iv. Apply and maintain gravel uniformly; or

v. Apply and maintain chemical/organic stabilizers/suppressants; or

vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.

ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.

iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:

i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or

ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or

iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or

iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or

v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8%;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or

c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or

d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply and maintain dust suppressants other than water; or

c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and
2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:
In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.
10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)

a. Manually sweeping and picking up; or
b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
c. Operating a PM10 efficient street sweeper; or
d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.

ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.

B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:

i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.

ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

Appendix H

Pinal County Rulemaking Process Documentation

Construction Rule

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
wide open opportunity

December 11, 2015

Mr. Jared Blumenfeld, Regional Administrator
U.S. Environmental Protection Agency, Region IX
Mail Code ORA-1
75 Hawthorn Street
San Francisco, CA 94105

c/o Misael Cabrera, Director of Arizona Department of Environmental Quality
c/o Eric Massey, Director Air Quality Division
1110 W. Washington
Phoenix, AZ 85007

Re: Submittal of Proposed Revision to the Arizona State Implementation Plan: West Pinal PM10 NAA Construction Fugitive Dust Rules

Dear Mr. Blumenfeld:

Pursuant to Resolution No. 102815-AQ1 as adopted by the Pinal County Board of Supervisors on October 28, 2015, 2015, I convey a requested revision to certain rules that compromise the Pinal County portion of the Arizona State Implementation Plan. This submittal proposes SIP-approval for newly adopted rules establishing RACM for construction and earthmoving fugitive dust sources within the West Pinal PM10 NAA.

If you have any question, please contact me at the number shown below or Scott DiBiase at (520)866-6969.

Sincerely,

Michael Sundblom
Director
Pinal County Air Quality Control District
(520)866-6915

1. Table of Contents

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1. Table of Contents
2. Legal Adoption Authority
   a. Kevin Costello, Deputy County Attorney, 11/24/15 Memo – Authority to Adopt Resolution No. 102815-AQ1.
3. Clean Copy of SIP Changes
   a. "CLEAN COPY" as amended October 28, 2015.
4. Strikeout Copy of SIP Changes
   a. "STRIKEOUT COPY" as amended October 28, 2015.
5. Public Notices
   a. Construction fugitive dust rulemaking stakeholder meeting, public notice, public comment period email and attachments (Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding) from Nelda Nunez to stakeholders (8/6/15 12:22 p.m.).
   b. Arizona Administrative Register (AAR) Agency Receipt (8/7/15 2:10 pm) – Notice of Proposed Rulemaking Docket Opening, Intended for publication on August 28, 2015.
   c. Arizona Administrative Register (AAR) (8/7/15 2:10 pm) – Notice of Proposed Rulemaking Docket Opening, Intended for publication on August 28, 2015.
   d. Arizona Administrative Register (AAR) Agency Receipt (8/7/15 2:10 pm) – Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding, Intended for publication on August 28, 2015.
   e. Arizona Administrative Register (AAR) (8/7/15 2:11 pm) – Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding Intended for publication on August 28, 2015.
   f. Posting Certification of Notice, Public Notice Air Quality Proposed Rulemaking, Public Comment Period & Oral Proceeding – August 6, 2015, Signed by Tanya Palmos, Secretary, Pinal County Air Quality Control District.
   g. Arizona Administrative Register (AAR) Notice of Rulemaking Docket Opening, 21 AAR pages 1715-1716, August 28, 2015.
   h. Arizona Administrative Register (AAR) Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding, 21 AAR page 1716-1730, August 28, 2015.

i. Construction Fugitive Dust Stakeholder Meeting agenda (Tuesday, September 1, 2015, 1 p.m., Ocotillo Room).
j. Draft Construction Fugitive Dust stakeholder meeting sign-in sheet (September 1, 2015, 1 p.m., Ocotillo Room, Building F).
k. Arizona Department of Environmental Quality (ADEQ) Handout from 9/1/15 stakeholder meeting – Pinal County PM_{10} Nonattainment Area SIP Overview.
l. Pinal County presentation – West Pinal PM10 Nonattainment Area Construction Dust Rule (Kale Walch, 9/1/15).
m. Affidavit of Publication – September 17, 2015 – Florence Reminder & Blade-Tribune, Public Notice, Proposed Rulemaking, Board of Supervisors Public Hearing. Published on September 17, 2015.
n. Affidavit of Publication – September 17, 2015 – Casa Grande Dispatch, Public Notice, Proposed Rulemaking, Board of Supervisors Public Hearing. Published on September 17, 2015.
o. Posting Certification of Notice, Public Notice Proposed Rulemaking, Board of Supervisors Public Hearing – September 16, 2015, Signed by Tanya Palmos, Secretary, Pinal County Air Quality Control District.
p. Public Notice – Pinal County Air Quality rulemakings – Public Notice Board of Supervisors Public Hearing October 28, 2015. Emailed (September 11, 2015 10:12 a.m.) from Nelda Nunez to stakeholders – no attachment.
q. Public Notice – Pinal County Air Quality rulemakings – Public Notice Board of Supervisors Public Hearing October 28, 2015. Emailed (September 15, 2015 7:52 a.m.) from Scott DiBiase, with attachment (public notices).
r. Construction Fugitive Dust Proposed Rulemaking Oral Proceeding agenda, Monday, September 28, 2015, Building F, Ocotillo room.
s. Construction Fugitive Dust Proposed Rulemaking Oral Proceeding Sign-in sheet, Monday, September 28, 2015, Building F, Ocotillo room.

6. Public Comment
   a. December 2, 2015 Memo from Scott DiBiase to File.

7. Evidence of Legal Adoption
   a. BOS Agenda Item for October 28, 2015 BOS meeting including Pinal County Board of Supervisors Resolution No. 102815-AQ1 and Concise Explanatory Statement.
   b. Notice of Public Meeting and Executive Session Pinal County Board of Supervisors Summary of Agenda for Regular Session, Wednesday, October 28, 2015.
   c. Powerpoint presentation given by Michael Sundblom, Director of Pinal County Air Quality Control District to Pinal County Board of Supervisors at the October 28, 2015 Public Hearing.

d. October 28, 2015 Pinal County Board of Supervisors Regular Session Minutes – For brevity purposes (summary of minutes from the meeting total 128 pages), only front page and pertinent pages for air quality Public Hearing (pages 15-16) of the October 28, 2015 BOS Regular Session minutes are included in the binder.
e. Signed copy of the BOS agenda item and 102815-AQ1 resolution.
f. Agency Receipt (October 30, 2015, 10:34 a.m.), Notice of Final Rulemaking – intended for publication on November 20, 2015.
g. Arizona Administrative Register time stamped copy (October 30, 2015 10:34 a.m.) of the Notice of Final Rulemaking – intended for publication on November 20, 2015.
h. Arizona Administrative Register (AAR) Notice of Final Rulemaking, 21 AAR pages 2937-2950, November 20, 2015.

8. Technical Materials
   a. "SIP Submittal" checklist.
   b. SIP Enforceability Checklist.

9. Digital Copy – CD with the following files
   a. PCAQCD_RACM_Construction_Fugitive_Dust.pdf - entire SIP submittal package

2. Legal Adoption Authority

OFFICE OF THE PINAL COUNTY ATTORNEY

M E M O R A N D U M

To: Concerned Citizens

From: Kevin Costello, Deputy County Attorney– CIVIL DIVISION

Date: November 24, 2015

Subject: Authority to Adopt Resolution No. 102815-AQ1

Subject to Compliance with the statutorily required mechanics-of-adoption, the Pinal County Board of Supervisors has specific authority to adopt and implement rules to control the release into the atmosphere of air contaminants originating within the territorial limits of the County.

Authority to Adopt Rules

Subject to certain procedural requirements, the Pinal County Board of Supervisors has authority to adopt "such rules as it determines are necessary and feasible to control the release into the atmosphere of air contaminants originating within the territorial limits of the County". A.R.S. § 49-479(A) (2008). The statutory prerequisites include a requirement for a statutorily defined public process prior to adoption. See A.R.S. § 49-471.01, *et seq*. (2008). The statutory prerequisites also include a requirement for a justification for rules that are more stringent than those of the Arizona Department of Environmental Quality, See A.R.S. § 49-112(A)(2008); and a limitation that the fee or cost for any permit or approval must not exceed the fee or cost of obtaining a similar permit or approval from the Arizona Department of Environmental Quality. See A.R.S. §§ 49-112(A) and (B), (2008).

Authority to Implement Rules

In addition, the Board of Supervisors has authority to authorize a department to carry out the necessary investigations, inspections and enforcement of any rules adopted pursuant to prevailing statutory authority. See A.R.S. §§ 49-473(B), 49-502, 49-510, 49-511, 49-512, 49-513, 49-514 and 49-515, (2008).

Authority to Adopt and Implement Resolution No. 102815-AQ1

In the case of Pinal County Board of Supervisors Resolution No. 102815-AQ1, the recitations in the resolution recite compliance with statutory notification requirements for adoption.

Since the adopted rule does not directly impose or establish a fee, the statutory limits on fee-imposition do not apply.

Therefore, on behalf of the Office of the Pinal County Attorney, I conclude that the Pinal County Board of Supervisors had authority to adopt, and has continuing authority to implement the rule revisions embodied in Resolution No. 102815-AQ1.

P.O. BOX 887, FLORENCE, AZ 85132 | MAIN: 520.866.6271 |
| FAX: 520.866.6521 |

3. Clean Copy of SIP Changes

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

CODE OF REGULATIONS

"CLEAN COPY"

AS AMENDED OCTOBER 28, 2015

PREPARED BY

AIR QUALITY CONTROL DISTRICT STAFF

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)

ii. §4-3-170 (As amended 10/28/15)
iii. §4-3-180 (As amended 10/28/15)
iv. §4-3-190 (As amended 10/28/15)

d. Article 4 (As amended 6/3/09).
e. Article 5 (As amended 6/3/09).
f. Reserved.
g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
   i. §4-9-320 (As amended 6/3/09)
   ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]

7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent
   The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:
2. Exemptions
   The following are exempt from this Article, or portions of this Article:
   a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).
   b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.
   c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.
   d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).
   e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

   This definition excludes those permanently stabilized areas that have:

   a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
   b. Been paved or otherwise covered by a permanent structure; or
   c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:
   a) Earthmoving activities
   b) Land clean-up, leveling, back filling
   c) Drilling
   d) Construction
   e) Demolition
   f) Bulk material handling, storage and/or transporting operations
   g) Operation of motorized machinery used in Construction
   h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
   i) Installing initial landscapes using mechanized equipment

   For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.
7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.
9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.
11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of

soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.

21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.
23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.
28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.
    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:
        i. Trenches less than four feet in depth, that exceed a length of 726 feet;
        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:
    1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the

work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:

1. Install suitable trackout control prior to the start of dust generating operations;
2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:

   a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or

   b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
   a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
   b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for dust generating operations associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.

v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.

vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:

a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the-completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.

f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:
   i. Project Name
   ii. Name and phone number of person(s) responsible for conducting project
   iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:
If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:
   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

4. Strikeout Copy of SIP Changes

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

CODE OF REGULATIONS

"STRIKEOUT COPY"

AS AMENDED OCTOBER 28, 2015

PREPARED BY

AIR QUALITY CONTROL DISTRICT STAFF

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)

ii. §4-3-170 (As amended 10/28/15)
iii. §4-3-180 (As amended 10/28/15)
iv. §4-3-190 (As amended 10/28/15)

d. Article 4 (As amended 6/3/09).
e. Article 5 (As amended 6/3/09).
f. Reserved.
g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
   i. §4-9-320 (As amended 6/3/09)
   ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]

7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

This definition excludes those permanently stabilized areas that have:

a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
b. Been paved or otherwise covered by a permanent structure; or
c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

a) Earthmoving activities
b) Land clean-up, leveling, back filling
c) Drilling
d) Construction
e) Demolition
f) Bulk material handling, storage and/or transporting operations
g) Operation of motorized machinery used in Construction
h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.

9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.

11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of

soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.

21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.
23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.
28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.
    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:
        i. Trenches less than four feet in depth, that exceed a length of 726 feet;
        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:
    1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the

work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:

1. Install suitable trackout control prior to the start of dust generating operations;
2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:

   a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or

   b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
   a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
   b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for dust generating operations associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.

v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.

vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:

a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.

f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:

   i. Project Name

   ii. Name and phone number of person(s) responsible for conducting project

   iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:

   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

5. Public Notice

Scott DiBiase

From: Nelda Nunez
Sent: Thursday, August 06, 2015 12:22 PM
To: 'Amanda McGennis'; 'Amy Courson'; 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brad Steinke'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'George Hoffman (ghoffman@ajcity.net)'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; 'hkrauss@ci.eloy.az.us'; 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson (jimt@casagrandeaz.gov)'; 'jmehta@marana.com'; 'Jo Crumbaker (jcrumbaker@mail.maricopa.gov)'; 'Joe Sigg (joesigg@azfb.org)'; 'John Insalaco (jmason@ajcity.net)'; 'John Kross (john.kross@queencreek.org)'; 'Jon Post (jpost@marana.com)'; 'Joonwon Joo (jjoo@azdot.gov)'; 'Joseph Nagy - City of Eloy (jnagy@ci.eloy.az.us)'; 'Juan Ponce (publicworks@townofmammoth.com)'; 'Julia Gusse (julia.gusse@maricopa-az.gov)'; 'Karl Montoya (kmontoya@casagrandeaz.gov)'; 'Kazi Haque (kazi.haque@maricopa-az.gov)'; 'Kevin Boesch (kboesch@ladaz.com)'; 'Kevin Louis (klouis@casagrandeaz.gov)'; 'Kevin Wanttaja - Salrt River Project (kevin.wantaja@srpnet.com)'; 'khall@cagaz.org'; 'Larry Hawke - Pima County Department of Environmental Quality (larry.hawke@pima.gov)'; 'ldunagan@ci.eloy.az.us'; 'Leroy Williams (williams@gilanet.net)'; 'lfitzgibbons@casagrandeaz.gov'; 'Lindy Bauer (lbauer@mag.maricopa.gov)'; 'Lisa Garcia (lisa.garcia@florenceaz.gov)'; 'Louis Manuel Jr (lmanuel@ak-chin.nsn.us)'; 'Maeve Clancy (clancy.maeve@epa.gov)'; 'Margaret Gaston (townmanager@superior-arizona.com)'; 'mark.eckhoff@florenceaz.gov'; 'Marvin Brown (marvin.brown@maricopa-az.gov)'; 'Mary Kortsen (mkortsen@casagrandeaz.gov)'; 'massey.eric@azdeq.gov'; 'Matt Herman (mherman@casagrandeaz.gov)'; 'Michael Curtis (mcurtis401@aol.com)'; 'Michael Jackson (cactus2yelap@hotmail.com)'; 'Michael Wesley (mwesley@khov.com)'; 'Morgan Holmes (mholmes@cgsuslaw.com)'; 'mrichardson@asarco.com'; 'nancy.nesky@aps.com'; 'Nick Simonetta (nick@pivotalpolicyconsulting.com)'; 'Norman Hinz (nhinz@pinalfeeding.com)'; 'Ole Solberg (ole@solbergengineering.com)'; 'Patrick Bray (pbray@arizonabeef.org)'; 'Patti Comerford (pcomerford@marana.com)'; 'Paul Jepson (paul.jepson@maricopa-az.gov)'; 'Peggy Chapados (peggy.chapados@maricopa-az.gov)'; Pete Rios; 'Phil McNeely (pmcneely@mail.maricopa.gov)'; 'Ralph Varela (rvarela@casagrandeaz.gov)'; 'Ramona Simpson (ramona.simpson@queencreek.org)'; 'Randy Schroeder (info@envalue.us)'; 'Richard Grimaldi (richard.grimaldi@pima.gov)'; 'Rick Lavis - Arizona Cotton Growers Association ()'; 'rios.gerardo@epamail.epa.gov';

To: 'rmiller@coolidgeaz.com'; 'Robert Boyle (mcclintockdairy@hotmail.com)'; 'Robert Flatley (bobf@coolidgeaz.com)'; 'Robert Goodhue (bob.goodhue@maricopa-az.gov)'; 'Rolf von Oppenfeld (rvo@testlaw.com)'; 'Roxanne Smith (roxannesmith@orbitelcom.com)'; 'Roxanne Ziegler (rziegler@marana.com)'; 'Rudy Mix (rudy.mix@gric.nsn.us)'; 'Russell Bowers (rusty@azrockproducts.org)'; 'Ryan Benavides (rbenavides@marana.com)'; 'Ryan Mahoney (rmahoney@marana.com)'; 'sam_hosler@msn.com'; 'Sandie Smith (sandie@pinalpartnership.com)'; 'Sandy Bahr (sandy.bahr@sierraclub.org)'; 'sarah.walters@pima.gov'; 'Scott Weaver (scott.weaver@erm.com)'; 'Shane Kieso (skiesow@ajcity.net)'; 'Spencer Kamps (kampss@hbaca.org)'; 'Steve Cheslak (scheslak@marana.com)'; Steve Miller; 'Steve Murray (smurray@asarco.com)'; 'Steve Trussell (steve@azrockproducts.org)'; 'Steven Johnson - Gila River Indian Community (steven.johnson@gric.nsn.us)'; 'Susanna Struble (sstruble@coolidgeaz.com)'; 'thompson5155@msn.com'; 'tim.sturdavant@hexcel.com'; Todd House; 'tom.rankin@florenceaz.gov'; Travis Ashbaugh; 'Troy White (troy.white@queencreek.org)'; 'Ursula Nelson (ursula.nelson@pima.gov)'; 'Walter Ritcher (walter.ritcher@swgas.com)'; 'Wavalene Romero - Tohono O'odham Nation (wavalene.romero@tonation-nsn.gov)'; 'Wayne Costa (wayne.costa@florenceaz.gov)'; 'Wendy Crites (wmcrites@srpnet.com)'; 'William Sullivan (wsullivan@cgsuslaw.com)'; 'Yvonne Everlund (yes4change@yahoo.com)'

Cc: Scott DiBiase; Michael Sundblom

Subject: Construction Fugitive Dust Rulemaking

Attachments: PCAQCD NPR Construction Fugitive Dust.pdf

Stakeholders,

Ongoing violations of the PM10 (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County. A requirement of the redesignation is the development of a State Implementation Plan (SIP). The Arizona Department of Environmental Quality (ADEQ) is the state agency responsible for development and submittal of the SIP to EPA. The SIP includes identification of the problem (i.e. emissions inventory) and a solution to the problem (i.e. rules). The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM10 emissions inventory for the West Pinal PM10 Nonattainment Area. The top three emissions sources in the base year PM10 emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This proposed rulemaking addresses the **construction** fugitive dust emissions associated with a significant portion of windblown dust and unpaved roads.

This proposed rulemaking will include a stakeholder meeting (September 1, 2015, 1 p.m., 31 N. Pinal St., Building F., Ocotillo Room, Florence, AZ.), a 30 day public comment period and a Control Officer Oral Proceeding. The Control Officer Oral Proceeding will be held on September 28, 2015 at 1 p.m. in the Ocotillo Room located at 31 N. Pinal St., Building F, Florence, AZ. Written or oral public comments are due before the close of business on September 28, 2015. The final step in the rulemaking process will be a Pinal County Board of Supervisors Public Hearing. The public hearing will be separately scheduled and publicly noticed. As a stakeholder, you will receive another email at least 30 days prior to the Board of Supervisors Public Hearing informing you of the date, time and location of the meeting.

Please see the attached Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding which has the full text of the proposed general fugitive dust rules. This combined notice will be published in the Arizona Administrative Register on August 28, 2015.

Sincerely,

Scott DiBiase
Pinal County Air Quality

Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

August 7, 2015 - **Intended for Publication on August 28, 2015**

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

COMBINED
NOTICE OF PROPOSED RULEMAKING
PURSUANT TO A.R.S. §49-112 AND §49-471.01 *et seq.*
AND
NOTICE OF ORAL PROCEEDING
PURSUANT TO A.R.S. 49-471.06

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposes that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The proposed construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity, ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the proposed rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The proposed amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections 160, 170, 180, 190) through ADEQ to

EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the proposed corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	**Rulemaking Action**
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this proposal may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov. To the extent possible, the District will also post information on the County's website, *pinalcountyaz.gov*, under the "air quality" link.

D. The rule making process will consist of an initial administrative rule development process, including this notice, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee. The date and location for the oral proceeding is set forth below. Written comments are due prior to the close of the comment period, which shall be the close-of-business on the day of the oral proceeding. The final step in the rule adoption process will be a hearing before the Board of Supervisors. The Board of Supervisors hearing will be separately scheduled and noticed in accord with A.R.S. §49-479, and, where applicable, the requirements of 40 C.F.R. §51.102.

E. The proposed revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.

b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where dust is required to test and validate the design integrity, product quality, etc.
d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).
e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.
f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.

3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.
4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A - For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B – For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
     3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
        a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
        b) All dust generating operations are ceased and disturbed surface areas are stabilized.

- Subsection C – Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.
    1. Application form requirements.
        a) Applicant must provide essential identification on an application form approved by the control officer. Separate application forms required for non-contiguous areas, unless it's an annual block permit.
        b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.
        c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.
        d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.
        e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).
            a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application for more than one job site, though each work site has to be described in the application along with what type of dust generating operations are to be conducted.
            b. Area block applications are only available to
                i. Political subdivisions and
                ii. Public utility corporations regulated by the Arizona Corporation Commission and
                iii. Contractors or subcontractors for political subdivisions or public utility corporations
            c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.
            d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and

type of dust generating operation, control measures used and start date.

2. Permit and recordkeeping requirements.
   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work site at all times dust generating operations are taking place. The permit is to reside on the work site.
   b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.
   c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.
   d) Completion of project notification to Control Officer – no later than 30 days after completion.
   e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.
   f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)
   - Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.
   - Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:
     1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:
        a) All dust generating operations are ceased until the opacity violations are no longer taking place, or
        b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.

2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

There are estimated small incremental costs to the businesses potentially affected by the proposed construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these proposed rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time. Pinal County is interested in feedback from the regulated community affected by these proposed construction fugitive dust rules regarding the estimated added costs attributed to opacity certifications, on-site inspections and recordkeeping.

The stabilization requirements of the proposed rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule proposal for water use wouldn't be additionally burdensome. However, Pinal County once again is interested in feedback from the regulated community affected by these proposed construction fugitive dust rules.

Pinal County

Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs

associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The proposed changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these proposed changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the proposed rule or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, ###, August 28, 2015.

L. Date, time and location of scheduled oral proceeding:

1) Oral Proceeding

Date:	September 28, 2015
Time:	1 p.m.
Location:	31 N. Pinal St., Florence, AZ. Building F, Ocotillo room

Nature of meeting: Oral proceeding before the Control Officer or his designee in accord with A.R.S. §49-471.06(C) to consider public comments upon any or all of this proposal.

2. The full text of the proposed changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended ##/##/15)
      ii. §4-3-170 (As amended ##/##/15)
      iii. §4-3-180 (As amended ##/##/15)
      iv. §4-3-190 (As amended ##/##/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:

1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:

1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*

19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with CONSTRUCTION activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with CONSTRUCTION.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any DUST GENERATING OPERATION at any WORK SITE, without complying with this Article:
2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any DUST GENERATING OPERATIONs are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).
b. In the case of an EMERGENCY, action may be taken to stabilize a DUST GENERATING OPERATION or DISTURBED SURFACE AREA before submitting a DUST GENERATING OPERATION application form. Upon stabilizing the EMERGENCY situation, a DUST GENERATING OPERATION application form shall be submitted.
c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the

application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to ROAD MAINTENANCE activities, however, any DUST GENERATING OPERATIONs are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to DUST GENERATION OPERATIONS associated with the EMERGENCY repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of BULK MATERIALS, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a WORK SITE in order to comply with applicable standards in section §4-3-180. CONTROL MEASURES include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any DUST GENERATION OPERATION. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or DUST SUPPRESSANTS	Apply chemical stabilizers/DUST SUPPRESSANTS to DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the FREEBOARD is not less than three inches; and prevent spillage or loss of BULK MATERIAL from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
TRACKOUT CONTROL DEVICE	Install a TRACKOUT CONTROL DEVICE for WORK SITES 5 acres or larger. When TRACKOUT extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute MOTOR VEHICLES access to work site	Erect signs or install physical barriers to limit access of WORK SITE.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the WORK SITE. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

This definition excludes those permanently stabilized areas that have:

a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
b. Been paved or otherwise covered by a permanent structure; or
c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

a) EARTHMOVING ACTIVITIES
b) Land clean-up, leveling, back filling
c) Drilling
d) CONSTRUCTION
e) Demolition
f) BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATIONS
g) Operation of motorized machinery used in CONSTRUCTION
h) Establishing and/or using UNPAVED PARKING LOTS, haul/access roads within a WORK SITE
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, ROAD CONSTRUCTION, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.

9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the DUST GENERATING OPERATION to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.

11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does

not include particulate matter emitted directly from the exhaust of MOTOR VEHICLES and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the PAVED PUBLIC ROADWAY and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the MOTOR VEHICLES or HAUL TRUCKS prior to leaving the WORK SITE.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a PAVED PUBLIC ROADWAY and a WORK SITE entrance to dislodge mud, dirt and/or debris from the tires of the MOTOR VEHICLES or HAUL TRUCKS prior to leaving the WORK SITE.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting BULK MATERIALS.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, DUST GENERATING OPERATION permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a DUST GENERATING OPERATION subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.
21. "STABILIZE" means any previously disturbed surface area which, through application of water or DUST SUPPRESSANTS, shows visual or other evidence of surface crusting and

is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).

22. "TRACKOUT" means visible material deposited onto any PAVED PUBLIC ROADWAY, as defined in this Article, by traffic leaving a WORK SITE.
23. "TRACKOUT CONTROL DEVICE" as used in this Article, means a GRAVEL PAD, GRIZZLY, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a PAVED PUBLIC ROADWAY that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site UNPAVED ROAD used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing MOTOR VEHICLES on a WORK SITE.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.
28. "WORK SITE" as used in this Article, means any property upon which DUST GENERATING OPERATIONS occur during CONSTRUCTION, and which covers an area of 0.1 acres or larger.
    a. TRENCHES that are equal to or larger than the following dimensions are considered WORK SITES and are subject to the requirement of this Article:
        i. TRENCHES less than four feet in depth, that exceed a length of 726 feet;
        ii. TRENCHES that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of DISTURBED SURFACE AREAS for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a DUST GENERATING OPERATION application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for TRENCHES, land clearing or EARTHMOVING ACTIVITIES should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the WORK SITE, an OWNER AND/OR OPERATOR:
    1. Shall not conduct or allow DUST GENERATING OPERATIONS that result in OPACITY of the dust on the property to exceed twenty percent (20%) as measured using an OPACITY method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any DISTURBED SURFACE AREA. The OWNER AND/OR OPERATOR shall conduct every other week inspections to ensure that the WORK

SITE is STABILIZED. Ensuring the WORK SITE is STABILIZED shall include a site-wide inspection to ensure all applicable CONTROL MEASURES [as described in §4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs and DISTURBED SURFACE AREAs are STABILIZED.

B. Where an OWNER AND/OR OPERATOR obtains a DUST GENERATING OPERATION permit for a WORK SITE, or a combination of WORK SITES, which are 5 acres or larger, the OWNER AND/OR OPERATOR shall as soon as practicable:

1. Install a suitable TRACKOUT CONTROL DEVICE prior to the start of DUST GENERATING OPERATIONs;
2. For areas, or portions of areas, in which the DUST GENERATING OPERATIONS have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the WORK SITE is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the WORK SITE is STABILIZED shall include a site-wide inspection to ensure either:

   a. All applicable CONTROL MEASURES [as described in §4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs, and DISTURBED SURFACE AREAS are STABILIZED; or

   b. All DUST GENERATING OPERATIONs are ceased and DISTURBED SURFACE AREAS are STABILIZED.

C. Prior to engaging in any DUST GENERATING OPERATIONS on a WORK SITE, the OWNER AND/OR OPERATOR shall file a DUST GENERATING OPERATION application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. DUST GENERATING OPERATIONS Application Form:
   a. The applicant shall present a DUST GENERATING OPERATION application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not A CONTIGUOUS GEOGRAPHIC AREA to the location on the original application form, unless an annual block application is approved.
   b. The OWNER AND/OR OPERATOR shall provide a valid cell phone number or email address on the DUST GENERATING OPERATION application form. The OWNER AND/OR OPERATOR shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each DUST GENERATING OPERATION application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each DUST GENERATING OPERATION application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one CONTROL MEASURE for each DUST GENERATING OPERATION.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for DUST GENERATING OPERATIONS associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, UNPAVED ROADS, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The OWNER AND/OR OPERATOR operating at the WORK SITE may submit to the Control Officer one DUST GENERATING OPERATION application for more than one DUST GENERATING OPERATION at which CONSTRUCTION will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of DUST GENERATING OPERATIONS to be conducted.

v. The OWNER AND/OR OPERATOR of an area block permit operating at a WORK SITE shall adhere to the requirements of all current permits issued to the WORK SITE and will be required to re-apply CONTROL MEASURES as reasonable and necessary, or re-stabilize any DISTURBED SURFACE AREA that becomes disturbed as a result of the area block permit holder's work being done at the WORK SITE.

vi. For any project not listed in the DUST GENERATING OPERATION Annual Block Application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the DUST GENERATING OPERATION. Such notification must include the site location, size, and type of DUST GENERATING OPERATION, selected control measures, and start date.

2. DUST GENERATING OPERATION Permit and Recordkeeping:

a. The signed DUST GENERATING OPERATION permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary CONTROL MEASURES specific to the applicable project as proposed by the registrant. The signature of the OWNER AND/OR OPERATOR on the DUST GENERATING OPERATION permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable CONTROL MEASURES are implemented throughout the WORK SITE, at all times that DUST GENERATING OPERATIONS are being performed and during the duration of the project. The OWNER AND/OR OPERATOR shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the OWNER/OPERATOR shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the WORK SITE where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the DUST GENERATING OPERATION permit must be renewed. The OWNER AND/OR OPERATOR shall reapply for a DUST GENERATING OPERATION permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the DUST GENERATING OPERATION permit does not have to be contiguous, although all acreage covered by the renewed DUST GENERATING OPERATION permit must have been included in the original DUST GENERATING OPERATION permit.

f. At all sites that are five acres or larger, the OWNER AND/OR OPERATOR shall erect a project information sign at the main entrance that is visible to the public or at each end of the ROAD CONSTRUCTION project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:
   i. Project Name
   ii. Name and phone number of person(s) responsible for conducting project
   iii. Pinal County Air Quality Control District phone number.

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a WORK SITE during:

1. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements of §4-3-180 (A)(1), if all CONTROL MEASURES as specified in the permit, are implemented, applied and maintained, all DISTURBED SURFACE AREAs are STABILIZED, and one of the following:
   a. All DUST GENERATING OPERATIONs are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or
   b. Maintain documentation that any DUST GENERATING OPERATIONs that are still being performed are not the cause of and do not contribute to the opacity

violation. Documentation may include onsite opacity observations by a certified observer.

2. EMERGENCY maintenance of flood control channels and water retention basins if all CONTROL MEASURES, as specified in the permit are implemented, applied, and maintained.

SECRETARY OF STATE

2015 AUG -7 PM 2:10

FILED

AGENCY RECEIPT

NOTICE OF PROPOSED RULEMAKING DOCKET OPENING

This receipt accompanies hard-copies and disk publication submittals entitled:

a. Agency name: Pinal County Air Quality Control District
P.O. Box 987
Florence, Arizona 85132
(520)866-6929
(520)866-6967 FAX

b. "NOTICE OF RULEMAKING DOCKET OPENING" which is dated August 7, 2015 - intended for publication on August 28, 2015.

The proposed revisions to local air quality rules involve amending and adding a number of sections in the rules including but not limited to:

§1-1-105 SIP List ..... Amend
§4-3-160 General Provisions – West Pinal PM10 Nonattainment Area ..... New
§4-3-170 Definitions ..... New
§4-3-180 Dust Generating Operations – Standards, Application, Permit and Recordkeeping Requirements ..... New
§4-3-190 Violations ..... New

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

SECRETARY OF STATE

2015 AUG -7 PM 2: 10

FILED

August 7, 2015 - ***Intended for Publication on August 28, 2015***

PINAL COUNTY

NOTICE OF PROPOSED RULEMAKING DOCKET OPENING
(Ref. A.R.S. §41-1021)

1. **Title and its heading:** Pinal County Air Quality Control District Code of Regulations
   Regulations and headings: Chapter 1, Article 1, Section 105 – SIP List
   Chapter 4, Article 3 – Construction Sites – Fugitive Dust

   Rules and headings: §1-1-105. SIP List
   §4-3-160. General Provisions – West Pinal PM10 Nonattainment Area
   §4-3-170. Definitions
   §4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements
   §4-4-190. Violations

2. **Subject Matter of the Proposed Rule**

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County, in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate nonattainment area (West Pinal PM_{10} Nonattainment Area). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year emissions inventory (EI) for PM_{10} for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

PCAQCD will follow up this proposed rulemaking docket opening with a formal rulemaking proposal in which new construction fugitive dust rules in Chapter 4, Article 3 will be proposed to be added to the PCAQCD Code of Regulations. The construction rules are needed in order to achieve the emissions reductions in the West Pinal PM_{10} Nonattainment area necessary to attain the PM_{10} NAAQS.

The ultimate goal of the proposed rulemaking will be adoption of the rules by the Pinal County Board of Supervisors and submittal to EPA (through ADEQ) for inclusion into the Arizona SIP.

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

3. Prior Related Notices

None

4. Contact Information

Those wishing further information regarding any aspect of this proposal may contact

Name:	Scott DiBiase,
Title:	Air Quality Planning Manager
Address:	Pinal County Air Quality
	31 North Pinal St., Building F, Florence, Arizona, 85132
Telephone:	520-866-6929
Fax:	520-866-6967
E-mail:	scott.dibiase@pinalcountyaz.gov

To the extent possible, the District will also post information on the County's website, *www.pinalcountyaz.gov*, under the "air quality" link.

5. Opportunity for Written or Oral Comments

The District will publish a Notice of Proposed Rulemaking that will define a formal timetable for submittal of written comments. At any time prior to the close of that to-be-defined comment period, anyone may seek information or submit comments by contacting the Planning Manager at the address shown above. Ultimately, the public will also have an opportunity to offer comment in the public hearing before the Board of Supervisors.

6. Anticipated Timetable

To be announced in the Notice of Proposed Rulemaking.

SECRETARY OF STATE

2015 AUG -7 PM 2:10

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AGENCY RECEIPT

COMBINED NOTICE OF PROPOSED RULEMAKING AND NOTICE OF ORAL PROCEEDING

This receipt accompanies hard-copies and disk publication submittals entitled:

a. Agency name: Pinal County Air Quality Control District
P.O. Box 987
Florence, Arizona 85132
(520)866-6929
(520)866-6967 FAX

b. "COMBINED NOTICE OF PROPOSED RULEMAKING AND NOTICE OF ORAL PROCEEDING" which is dated August 7, 2015 - intended for publication on August 28, 2015.

The proposed revisions to local air quality rules involve amending and adding a number of sections in the rules including but not limited to:

§1-1-105 SIP List ..... Amend
§4-3-160 General Provisions – West Pinal PM10 Nonattainment Area ..... New
§4-3-170 Definitions ..... New
§4-3-180 Dust Generating Operations – Standards, Application, Permit and Recordkeeping Requirements ..... New
§4-3-190 Violations ..... New

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

SECRETARY OF STATE

2015 AUG -7 PM 2:11

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Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

August 7, 2015 - **Intended for Publication on August 28, 2015**

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

COMBINED
NOTICE OF PROPOSED RULEMAKING
PURSUANT TO A.R.S. §49-112 AND §49-471.01 *et seq.*
AND
NOTICE OF ORAL PROCEEDING
PURSUANT TO A.R.S. 49-471.06

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposes that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The proposed construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity, ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the proposed rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The proposed amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections 160, 170, 180, 190) through ADEQ to

EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the proposed corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	**Rulemaking Action**
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this proposal may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov. To the extent possible, the District will also post information on the County's website, *pinalcountyaz.gov*, under the "air quality" link.

D. The rule making process will consist of an initial administrative rule development process, including this notice, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee. The date and location for the oral proceeding is set forth below. Written comments are due prior to the close of the comment period, which shall be the close-of-business on the day of the oral proceeding. The final step in the rule adoption process will be a hearing before the Board of Supervisors. The Board of Supervisors hearing will be separately scheduled and noticed in accord with A.R.S. §49-479, and, where applicable, the requirements of 40 C.F.R. §51.102.

E. The proposed revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.

b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where dust is required to test and validate the design integrity, product quality, etc.
d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).
e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.
f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.

3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.
4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A - For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B – For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
     3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
        a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
        b) All dust generating operations are ceased and disturbed surface areas are stabilized.

- Subsection C – Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.
    1. Application form requirements.
        a) Applicant must provide essential identification on an application form approved by the control officer. Separate application forms required for non-contiguous areas, unless it's an annual block permit.
        b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.
        c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.
        d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.
        e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).
            a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application for more than one job site, though each work site has to be described in the application along with what type of dust generating operations are to be conducted.
            b. Area block applications are only available to
                i. Political subdivisions and
                ii. Public utility corporations regulated by the Arizona Corporation Commission and
                iii. Contractors or subcontractors for political subdivisions or public utility corporations
            c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.
            d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and

type of dust generating operation, control measures used and start date.

2. Permit and recordkeeping requirements.
   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work site at all times dust generating operations are taking place. The permit is to reside on the work site.
   b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.
   c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.
   d) Completion of project notification to Control Officer – no later than 30 days after completion.
   e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.
   f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)
   - Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.
   - Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:
     1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:
        a) All dust generating operations are ceased until the opacity violations are no longer taking place, or
        b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.

2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

There are estimated small incremental costs to the businesses potentially affected by the proposed construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these proposed rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time. Pinal County is interested in feedback from the regulated community affected by these proposed construction fugitive dust rules regarding the estimated added costs attributed to opacity certifications, on-site inspections and recordkeeping.

The stabilization requirements of the proposed rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule proposal for water use wouldn't be additionally burdensome. However, Pinal County once again is interested in feedback from the regulated community affected by these proposed construction fugitive dust rules.

Pinal County

Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs

associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The proposed changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these proposed changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the proposed rule or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, ###, August 28, 2015.

L. Date, time and location of scheduled oral proceeding:

1) Oral Proceeding

Date:	September 28, 2015
Time:	1 p.m.
Location:	31 N. Pinal St., Florence, AZ. Building F, Ocotillo room

Nature of meeting: Oral proceeding before the Control Officer or his designee in accord with A.R.S. §49-471.06(C) to consider public comments upon any or all of this proposal.

2. The full text of the proposed changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended ##/##/15)
      ii. §4-3-170 (As amended ##/##/15)
      iii. §4-3-180 (As amended ##/##/15)
      iv. §4-3-190 (As amended ##/##/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:

1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:

1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*

19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with CONSTRUCTION activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with CONSTRUCTION.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any DUST GENERATING OPERATION at any WORK SITE, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any DUST GENERATING OPERATIONs are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an EMERGENCY, action may be taken to stabilize a DUST GENERATING OPERATION or DISTURBED SURFACE AREA before submitting a DUST GENERATING OPERATION application form. Upon stabilizing the EMERGENCY situation, a DUST GENERATING OPERATION application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the

application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to ROAD MAINTENANCE activities, however, any DUST GENERATING OPERATIONs are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to DUST GENERATION OPERATIONS associated with the EMERGENCY repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of BULK MATERIALS, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a WORK SITE in order to comply with applicable standards in section §4-3-180. CONTROL MEASURES include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any DUST GENERATION OPERATION. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or DUST SUPPRESSANTS	Apply chemical stabilizers/DUST SUPPRESSANTS to DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the FREEBOARD is not less than three inches; and prevent spillage or loss of BULK MATERIAL from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
TRACKOUT CONTROL DEVICE	Install a TRACKOUT CONTROL DEVICE for WORK SITES 5 acres or larger. When TRACKOUT extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute MOTOR VEHICLES access to work site	Erect signs or install physical barriers to limit access of WORK SITE.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the WORK SITE. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

This definition excludes those permanently stabilized areas that have:

a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
b. Been paved or otherwise covered by a permanent structure; or
c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

a) EARTHMOVING ACTIVITIES
b) Land clean-up, leveling, back filling
c) Drilling
d) CONSTRUCTION
e) Demolition
f) BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATIONS
g) Operation of motorized machinery used in CONSTRUCTION
h) Establishing and/or using UNPAVED PARKING LOTS, haul/access roads within a WORK SITE
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, ROAD CONSTRUCTION, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.

9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the DUST GENERATING OPERATION to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.

11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does

not include particulate matter emitted directly from the exhaust of MOTOR VEHICLES and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the PAVED PUBLIC ROADWAY and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the MOTOR VEHICLES or HAUL TRUCKS prior to leaving the WORK SITE.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a PAVED PUBLIC ROADWAY and a WORK SITE entrance to dislodge mud, dirt and/or debris from the tires of the MOTOR VEHICLES or HAUL TRUCKS prior to leaving the WORK SITE.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting BULK MATERIALS.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, DUST GENERATING OPERATION permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a DUST GENERATING OPERATION subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.
21. "STABILIZE" means any previously disturbed surface area which, through application of water or DUST SUPPRESSANTS, shows visual or other evidence of surface crusting and

is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).

22. "TRACKOUT" means visible material deposited onto any PAVED PUBLIC ROADWAY, as defined in this Article, by traffic leaving a WORK SITE.
23. "TRACKOUT CONTROL DEVICE" as used in this Article, means a GRAVEL PAD, GRIZZLY, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a PAVED PUBLIC ROADWAY that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site UNPAVED ROAD used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing MOTOR VEHICLES on a WORK SITE.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.
28. "WORK SITE" as used in this Article, means any property upon which DUST GENERATING OPERATIONS occur during CONSTRUCTION, and which covers an area of 0.1 acres or larger.
    a. TRENCHES that are equal to or larger than the following dimensions are considered WORK SITES and are subject to the requirement of this Article:
        i. TRENCHES less than four feet in depth, that exceed a length of 726 feet;
        ii. TRENCHES that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of DISTURBED SURFACE AREAS for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a DUST GENERATING OPERATION application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for TRENCHES, land clearing or EARTHMOVING ACTIVITIES should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the WORK SITE, an OWNER AND/OR OPERATOR:
    1. Shall not conduct or allow DUST GENERATING OPERATIONS that result in OPACITY of the dust on the property to exceed twenty percent (20%) as measured using an OPACITY method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any DISTURBED SURFACE AREA. The OWNER AND/OR OPERATOR shall conduct every other week inspections to ensure that the WORK

SITE is STABILIZED. Ensuring the WORK SITE is STABILIZED shall include a site-wide inspection to ensure all applicable CONTROL MEASURES [as described in §4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs and DISTURBED SURFACE AREAs are STABILIZED.

B. Where an OWNER AND/OR OPERATOR obtains a DUST GENERATING OPERATION permit for a WORK SITE, or a combination of WORK SITES, which are 5 acres or larger, the OWNER AND/OR OPERATOR shall as soon as practicable:

1. Install a suitable TRACKOUT CONTROL DEVICE prior to the start of DUST GENERATING OPERATIONs;
2. For areas, or portions of areas, in which the DUST GENERATING OPERATIONS have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the WORK SITE is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the WORK SITE is STABILIZED shall include a site-wide inspection to ensure either:

   a. All applicable CONTROL MEASURES [as described in §4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs, and DISTURBED SURFACE AREAS are STABILIZED; or

   b. All DUST GENERATING OPERATIONs are ceased and DISTURBED SURFACE AREAS are STABILIZED.

C. Prior to engaging in any DUST GENERATING OPERATIONS on a WORK SITE, the OWNER AND/OR OPERATOR shall file a DUST GENERATING OPERATION application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. DUST GENERATING OPERATIONS Application Form:
   a. The applicant shall present a DUST GENERATING OPERATION application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not A CONTIGUOUS GEOGRAPHIC AREA to the location on the original application form, unless an annual block application is approved.
   b. The OWNER AND/OR OPERATOR shall provide a valid cell phone number or email address on the DUST GENERATING OPERATION application form. The OWNER AND/OR OPERATOR shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each DUST GENERATING OPERATION application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each DUST GENERATING OPERATION application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one CONTROL MEASURE for each DUST GENERATING OPERATION.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for DUST GENERATING OPERATIONS associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, UNPAVED ROADS, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The OWNER AND/OR OPERATOR operating at the WORK SITE may submit to the Control Officer one DUST GENERATING OPERATION application for more than one DUST GENERATING OPERATION at which CONSTRUCTION will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of DUST GENERATING OPERATIONS to be conducted.

v. The OWNER AND/OR OPERATOR of an area block permit operating at a WORK SITE shall adhere to the requirements of all current permits issued to the WORK SITE and will be required to re-apply CONTROL MEASURES as reasonable and necessary, or re-stabilize any DISTURBED SURFACE AREA that becomes disturbed as a result of the area block permit holder's work being done at the WORK SITE.

vi. For any project not listed in the DUST GENERATING OPERATION Annual Block Application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the DUST GENERATING OPERATION. Such notification must include the site location, size, and type of DUST GENERATING OPERATION, selected control measures, and start date.

2. DUST GENERATING OPERATION Permit and Recordkeeping:

a. The signed DUST GENERATING OPERATION permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary CONTROL MEASURES specific to the applicable project as proposed by the registrant. The signature of the OWNER AND/OR OPERATOR on the DUST GENERATING OPERATION permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable CONTROL MEASURES are implemented throughout the WORK SITE, at all times that DUST GENERATING OPERATIONS are being performed and during the duration of the project. The OWNER AND/OR OPERATOR shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the OWNER/OPERATOR shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the WORK SITE where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the-completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the DUST GENERATING OPERATION permit must be renewed. The OWNER AND/OR OPERATOR shall reapply for a DUST GENERATING OPERATION permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the DUST GENERATING OPERATION permit does not have to be contiguous, although all acreage covered by the renewed DUST GENERATING OPERATION permit must have been included in the original DUST GENERATING OPERATION permit.

f. At all sites that are five acres or larger, the OWNER AND/OR OPERATOR shall erect a project information sign at the main entrance that is visible to the public or at each end of the ROAD CONSTRUCTION project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:
   i. Project Name
   ii. Name and phone number of person(s) responsible for conducting project
   iii. Pinal County Air Quality Control District phone number.

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a WORK SITE during:

1. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements of §4-3-180 (A)(1), if all CONTROL MEASURES as specified in the permit, are implemented, applied and maintained, all DISTURBED SURFACE AREAs are STABILIZED, and one of the following:
   a. All DUST GENERATING OPERATIONs are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or
   b. Maintain documentation that any DUST GENERATING OPERATIONs that are still being performed are not the cause of and do not contribute to the opacity

violation. Documentation may include onsite opacity observations by a certified observer.

2. EMERGENCY maintenance of flood control channels and water retention basins if all CONTROL MEASURES, as specified in the permit are implemented, applied, and maintained.

PINAL COUNTY DEPARTMENT OF DEVELOPMENT SERVICES
AIR QUALITY CONTROL DISTRICT
POST OFFICE BOX 987, FLORENCE, ARIZONA 85232

POSTING CERTIFICATION OF NOTICE

The undersigned hereby certifies that a copy of the attached notice was duly posted at:

(1) Pinal County Administration 1 – Bldg A Lobby on August 6th

(2) Pinal County Treasurer's Office – Bldg E on August 6th

(3) Pinal County Admin 3 – Bldg F Lobby on August 6th

(4) Justice Court – 400 S Central Ave on August 6th

(5) Pinal Co Clerk of the Court – 971 Jason Lopez Ci on August 6th

in accordance with the statement filed by the PINAL COUNTY AIR QUALITY CONTROL ADVISORY COUNCIL with the Clerk of the Pinal County Board of Supervisors.

Dated this 6th day of August, 2015

Tanya R. Palmos
Secretary
Pinal County Air Quality Control District

Michael Sundblom
Air Quality Director

PINAL • COUNTY
wide open opportunity

Greg Stanley
County Manager

Public Notice

Air Quality Proposed Rulemaking

Public Comment Period & Oral Proceeding

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. A formal notice, including the full text of the proposed revisions, will be available in the August 28, 2015 edition of the Arizona Administrative Register, which is available on-line at www.azsos.gov . The ultimate purpose of this proposed rulemaking will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

Ongoing violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County. A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification of the problem (i.e. emissions inventory) and a solution to the problem (i.e. rules). The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area. The top three emissions sources in the base year PM_{10} emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This proposed rulemaking addresses the construction fugitive dust emissions associated with development activities.

This proposed rulemaking will include a stakeholder meeting (September 1, 2015, 1 p.m., 31 N. Pinal St., Building F., Ocotillo Room, Florence, AZ.), a 30 day public comment period and a Control Officer Oral Proceeding. The Control Officer Oral Proceeding will be held on September 28, 2015 at 1 p.m. in the Ocotillo Room located at 31 N. Pinal St., Building F, Florence, AZ.

Written or oral public comments are due before the close of business on September 28, 2015. Copies of the proposal, and additional information, are available from Pinal County Air Quality, 31 North Pinal Street, Florence, AZ. 85132, or by calling 520-866-6929 or online at http://www.pinalcountyaz.gov/AirQuality/Pages/Rulemaking.aspx.

The final step in the rulemaking process will be a Pinal County Board of Supervisors Public Hearing. The public hearing will be separately scheduled and publicly noticed.

COUNTY NOTICES ACCORDING TO A.R.S. § 49-112

This section of the *Arizona Administrative Register* contains County Notices (according to A.R.S. § 49-112).

Each county writes rules and regulations in its own unique style. Although these notices are published in the *Register*, they do not conform to the standards specified in the *Arizona Rulemaking Manual*. With the exception of minor formatting changes, County Notices (including subsection labeling, spelling, grammar, and punctuation) are reproduced as submitted.

NOTICE OF RULEMAKING DOCKET OPENING

[M15-210]

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

(Ref. A.R.S. §41-1021)

1. Title and its heading: Pinal County Air Quality Control District Code of Regulations

Regulations and headings:
Chapter 1, Article 1, Section 105 – SIP List
Chapter 4, Article 3 – Construction Sites – Fugitive Dust

Rules and headings:
§1-1-105. SIP List
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area
§4-3-170. Definitions
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements
§4-4-190. Violations

2. Subject Matter of the Proposed Rule:

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County, in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate nonattainment area (West Pinal PM_{10} Nonattainment Area). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year emissions inventory (EI) for PM_{10} for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

PCAQCD will follow up this proposed rulemaking docket opening with a formal rulemaking proposal in which new construction fugitive dust rules in Chapter 4, Article 3 will be proposed to be added to the PCAQCD Code of Regulations. The construction rules are needed in order to achieve the emissions reductions in the West Pinal PM_{10} Nonattainment area necessary to attain the PM_{10} NAAQS.

The ultimate goal of the proposed rulemaking will be adoption of the rules by the Pinal County Board of Supervisors and submittal to EPA (through ADEQ) for inclusion into the Arizona SIP.

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

3. Prior Related Notices:

None

4. Contact Information:

Those wishing further information regarding any aspect of this proposal may contact

Name: Scott DiBiase,
Title: Air Quality Planning Manager
Address: Pinal County Air Quality

31 North Pinal St., Building F, Florence, AZ, 85132
Telephone: 520-866-6929
Fax: 520-866-6967
E-mail:scott.dibiase@pinalcountyaz.gov

To the extent possible, the District will also post information on the County's website, *www.pinalcountyaz.gov*, under the "air quality" link.

5. Opportunity for Written or Oral Comments:

The District will publish a Notice of Proposed Rulemaking that will define a formal timetable for submittal of written comments. At any time prior to the close of that to-be-defined comment period, anyone may seek information or submit comments by contacting the Planning Manager at the address shown above. Ultimately, the public will also have an opportunity to offer comment in the public hearing before the Board of Supervisors.

6. Anticipated Timetable:

To be announced in the Notice of Proposed Rulemaking.

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

[M15-211]

COMBINED
NOTICE OF PROPOSED RULEMAKING
PURSUANT TO A.R.S. §49-112 AND §49-471.01 *et seq.*
AND
NOTICE OF ORAL PROCEEDING
PURSUANT TO A.R.S. 49-471.06

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposes that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The proposed construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity, ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the proposed rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The proposed amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections

160, 170, 180, 190) through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the proposed corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this proposal may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov. To the extent possible, the District will also post information on the County's website, *pinalcountyaz.gov*, under the "air quality" link.

D. The rule making process will consist of an initial administrative rule development process, including this notice, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee. The date and location for the oral proceeding is set forth below. Written comments are due prior to the close of the comment period, which shall be the close-of-business on the day of the oral proceeding. The final step in the rule adoption process will be a hearing before the Board of Supervisors. The Board of Supervisors hearing will be separately scheduled and noticed in accord with A.R.S. §49-479, and, where applicable, the requirements of 40 C.F.R. §51.102.

E. The proposed revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.
        b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
        c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where dust is required to test and validate the design integrity, product quality, etc.

d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).

e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.

f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.

g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.

3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.

4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A - For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B - For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
     3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
        a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
        b) All dust generating operations are ceased and disturbed surface areas are stabilized.
   - Subsection C - Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.
     1. Application form requirements.
        a) Applicant must provide essential identification on an application form approved by the control officer. Separate application forms required for non-contiguous areas, unless it's an annual block permit.
        b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.
        c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.
        d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.
        e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).
           a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application for more than one job site, though each work site has to be described

in the application along with what type of dust generating operations are to be conducted.

b. Area block applications are only available to
   i. Political subdivisions and
   ii. Public utility corporations regulated by the Arizona Corporation Commission and
   iii. Contractors or subcontractors for political subdivisions or public utility corporations

c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.

d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and type of dust generating operation, control measures used and start date.

2. Permit and recordkeeping requirements.
   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work site at all times dust generating operations are taking place. The permit is to reside on the work site.
   b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.
   c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.
   d) Completion of project notification to Control Officer – no later than 30 days after completion.
   e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.
   f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)
   - Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.
   - Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:
     1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:
        a) All dust generating operations are ceased until the opacity violations are no longer taking place, or

b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.

2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

There are estimated small incremental costs to the businesses potentially affected by the proposed construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these proposed rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time. Pinal County is interested in feedback from the regulated community affected by these proposed construction fugitive dust rules regarding the estimated added costs attributed to opacity certifications, on-site inspections and recordkeeping.

The stabilization requirements of the proposed rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule proposal for water use wouldn't be additionally burdensome. However, Pinal County once again is interested in feedback from the regulated community affected by these proposed construction fugitive dust rules.

Pinal County

Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The proposed changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these proposed changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the proposed rule or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1715, August 28, 2015.

L. Date, time and location of scheduled oral proceeding:

1) Oral Proceeding
Date: September 28, 2015
Time: 1 p.m.
Location: 31 N. Pinal St., Florence, AZ.
Building F, Ocotillo room

Nature of meeting: Oral proceeding before the Control Officer or his designee in accord with A.R.S. §49-471.06(C) to consider public comments upon any or all of this proposal.

2. The full text of the proposed changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).

f. Article 6. (As amended 10/12/95).
g. Article 7. (As amended 10/12/95).
h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended ##/##/15)
      ii. §4-3-170 (As amended ##/##/15)
      iii. §4-3-180 (As amended ##/##/15)
      iv. §4-3-190 (As amended ##/##/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of

Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with CONSTRUCTION activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with CONSTRUCTION.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any DUST GENERATING OPERATION at any WORK SITE, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any DUST GENERATING OPERATIONs are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an EMERGENCY, action may be taken to stabilize a DUST GENERATING OPERATION or DISTURBED SURFACE AREA before submitting a DUST GENERATING OPERATION application form. Upon stabilizing the EMERGENCY situation, a DUST GENERATING OPERATION application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to ROAD MAINTENANCE activities, however, any DUST GENERATING OPERATIONs are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to DUST GENERATION OPERATIONS associated with the EMERGENCY repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of BULK MATERIALS, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a WORK SITE in order to comply with applicable standards in section §4-3-180. CONTROL MEASURES include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any DUST GENERATION OPERATION. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or DUST SUPPRESSANTS	Apply chemical stabilizers/DUST SUPPRESSANTS to DISTURBED SURFACE AREAS and DUST GENERATING OPERATIONS. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the FREEBOARD is not less than three inches; and prevent spillage or loss of BULK MATERIAL from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
TRACKOUT CONTROL DEVICE	Install a TRACKOUT CONTROL DEVICE for WORK SITES 5 acres or larger. When TRACKOUT extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute MOTOR VEHICLES access to work site	Erect signs or install physical barriers to limit access of WORK SITE.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the WORK SITE. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

   This definition excludes those permanently stabilized areas that have:

   a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

   b. Been paved or otherwise covered by a permanent structure; or

   c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

   a) EARTHMOVING ACTIVITIES

b) Land clean-up, leveling, back filling
c) Drilling
d) CONSTRUCTION
e) Demolition
f) BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATIONS
g) Operation of motorized machinery used in CONSTRUCTION
h) Establishing and/or using UNPAVED PARKING LOTS, haul/access roads within a WORK SITE
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, ROAD CONSTRUCTION, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.
9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the DUST GENERATING OPERATION to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.
11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of MOTOR VEHICLES and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the PAVED PUBLIC ROADWAY and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the MOTOR VEHICLES or HAUL TRUCKS prior to leaving the WORK SITE.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a PAVED PUBLIC ROADWAY and a WORK SITE entrance to dislodge mud, dirt and/or debris from the tires of the MOTOR VEHICLES or HAUL TRUCKS prior to leaving the WORK SITE.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting BULK MATERIALS.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, DUST GENERATING OPERATION permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a DUST GENERATING OPERATION subject to the requirements of this rule.

17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.
21. "STABILIZE" means any previously disturbed surface area which, through application of water or DUST SUPPRESSANTS, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any PAVED PUBLIC ROADWAY, as defined in this Article, by traffic leaving a WORK SITE.
23. "TRACKOUT CONTROL DEVICE" as used in this Article, means a GRAVEL PAD, GRIZZLY, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a PAVED PUBLIC ROADWAY that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site UNPAVED ROAD used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing MOTOR VEHICLES on a WORK SITE.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.
28. "WORK SITE" as used in this Article, means any property upon which DUST GENERATING OPERATIONS occur during CONSTRUCTION, and which covers an area of 0.1 acres or larger.
    a. TRENCHES that are equal to or larger than the following dimensions are considered WORK SITES and are subject to the requirement of this Article:
        i. TRENCHES less than four feet in depth, that exceed a length of 726 feet;
        ii. TRENCHES that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of DISTURBED SURFACE AREAS for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a DUST GENERATING OPERATION application is required for the site.

c. If the registrant identifies situations in which the amount of surface area for TRENCHES, land clearing or EARTHMOVING ACTIVITIES should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the WORK SITE, an OWNER AND/OR OPERATOR:

1. Shall not conduct or allow DUST GENERATING OPERATIONS that result in OPACITY of the dust on the property to exceed twenty percent (20%) as measured using an OPACITY method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
2. Shall stabilize any DISTURBED SURFACE AREA. The OWNER AND/OR OPERATOR shall conduct every other week inspections to ensure that the WORK SITE is STABILIZED. Ensuring the WORK SITE is STABILIZED shall include a site-wide inspection to ensure all applicable CONTROL MEASURES [as described in §4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs and DISTURBED SURFACE AREAs are STABILIZED.

B. Where an OWNER AND/OR OPERATOR obtains a DUST GENERATING OPERATION permit for a WORK SITE, or a combination of WORK SITES, which are 5 acres or larger, the OWNER AND/OR OPERATOR shall as soon as practicable:

1. Install a suitable TRACKOUT CONTROL DEVICE prior to the start of DUST GENERATING OPERATIONs;
2. For areas, or portions of areas, in which the DUST GENERATING OPERATIONS have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the WORK SITE is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the WORK SITE is STABILIZED shall include a site-wide inspection to ensure either:

   a. All applicable CONTROL MEASURES [as described in §4-3-170.4] as specified in the permit, are implemented on DUST GENERATING OPERATIONs, and DISTURBED SURFACE AREAS are STABILIZED; or

   b. All DUST GENERATING OPERATIONs are ceased and DISTURBED SURFACE AREAS are STABILIZED.

C. Prior to engaging in any DUST GENERATING OPERATIONS on a WORK SITE, the OWNER AND/OR OPERATOR shall file a DUST GENERATING OPERATION application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. DUST GENERATING OPERATIONS Application Form:
   a. The applicant shall present a DUST GENERATING OPERATION application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not A CONTIGUOUS GEOGRAPHIC AREA to the location on the original application form, unless an annual block application is approved.
   b. The OWNER AND/OR OPERATOR shall provide a valid cell phone number or email address on the DUST GENERATING OPERATION application form. The OWNER AND/OR OPERATOR shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each DUST GENERATING OPERATION application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each DUST GENERATING OPERATION application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one CONTROL MEASURE for each DUST GENERATING OPERATION.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for DUST GENERATING OPERATIONS associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, UNPAVED ROADS, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and,
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The OWNER AND/OR OPERATOR operating at the WORK SITE may submit to the Control Officer one DUST GENERATING OPERATION application for more than one DUST GENERATING OPERATION at which CONSTRUCTION will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of DUST GENERATING OPERATIONS to be conducted.

v. The OWNER AND/OR OPERATOR of an area block permit operating at a WORK SITE shall adhere to the requirements of all current permits issued to the WORK SITE and will be required to re-apply CONTROL MEASURES as reasonable and necessary, or re-stabilize any DISTURBED SURFACE AREA that becomes disturbed as a result of the area block permit holder's work being done at the WORK SITE.

vi. For any project not listed in the DUST GENERATING OPERATION Annual Block Application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the DUST GENERATING OPERATION. Such notification must include the site location, size, and type of DUST GENERATING OPERATION, selected control measures, and start date.

2. DUST GENERATING OPERATION Permit and Recordkeeping:

a. The signed DUST GENERATING OPERATION permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary CONTROL MEASURES specific to the applicable project as proposed by the registrant. The signature of the OWNER AND/OR OPERATOR on the DUST GENERATING OPERATION permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable CONTROL MEASURES are implemented throughout the WORK SITE, at all times that DUST GENERATING OPERATIONS are being performed and during the duration of the project. The OWNER AND/OR OPERATOR shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the OWNER/OPERATOR shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the WORK SITE where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the DUST GENERATING OPERATION permit must be renewed. The OWNER AND/OR OPERATOR shall reapply for a DUST GENERATING OPERATION permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the DUST GENERATING OPERATION permit does not have to be contiguous, although all acreage covered by the renewed DUST GENERATING OPERATION permit must have been included in the original DUST GENERATING OPERATION permit.

f. At all sites that are five acres or larger, the OWNER AND/OR OPERATOR shall erect a project information sign at the main entrance that is visible to the public or at each end of the ROAD CONSTRUCTION project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:

i. Project Name

ii. Name and phone number of person(s) responsible for conducting project

iii. Pinal County Air Quality Control District phone number.

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a WORK SITE during:

1. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements of §4-3-180 (A)(1), if all CONTROL MEASURES as specified in the permit, are implemented, applied and maintained, all DISTURBED SURFACE AREAs are STABILIZED, and one of the following:

a. All DUST GENERATING OPERATIONs are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any DUST GENERATING OPERATIONs that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacityobservations by a certified observer.

2. EMERGENCY maintenance of flood control channels and water retention basins if all CONTROL MEASURES, as specified in the permit are implemented, applied, and maintained.

NOTICE OF RULEMAKING DOCKET OPENING

[M15-212]

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

(Ref. A.R.S. §41-1021)

1. Title and its heading:	Pinal County Air Quality Control District Code of Regulations
Regulations and headings:	Chapter 1, Article 1, Section 105 – SIP List Chapter 4, Article 1 – Adopted Documents
Rules and headings:	§1-1-105. SIP List §4-1-010. Adopted document(s) §4-1-015. Exemptions §4-1-020. Definitions §4-1-030. Standards §4-1-040. Recordkeeping §4-1-045. Reporting Requirements §4-1-050. Records Retention

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
wide open opportunity

Construction Fugitive Dust Stakeholder Meeting
Tuesday, September 1, 2015
1 PM
Pinal County Ocotillo Room
31 N. Pinal Street, Florence, AZ.

1. Welcome

2. Introductions

3. SIP Background/Status

4. Proposed Rule Review

5. Discussion

PINAL • COUNTY

Wide open opportunity

PINAL COUNTY AIR QUALITY CONTROL DISTRICT
31 N. PINAL ST., FLORENCE, ARIZONA 85132

DRAFT CONSTRUCTION FUGITIVE DUST RULE STAKEHOLDER MEETING
SEPTEMBER 1, 2015 1 P.M. OCOTILLO ROOM, BUILDING F

Name	Organization	Address	Phone Number	Email
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Pinal County PM_{10} Nonattainment Area SIP Overview

Pinal County Stakeholder Meeting

31 N Pinal St, Florence, AZ

9/1/2015

Introduction

The Pinal County PM_{10} Nonattainment Area was redesignated as nonattainment for the 1987 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) by the U.S. Environmental Protection Agency (EPA) on July 2, 2012. Since this time, the Arizona Department of Environmental Quality (ADEQ) has been gathering and processing information to create an emission inventory for the designated nonattainment area. The resulting nonattainment area emission inventory informed control measure determination for emitting sources including, but not limited to, agriculture, construction, roads, unpaved lots, and vacant lots.

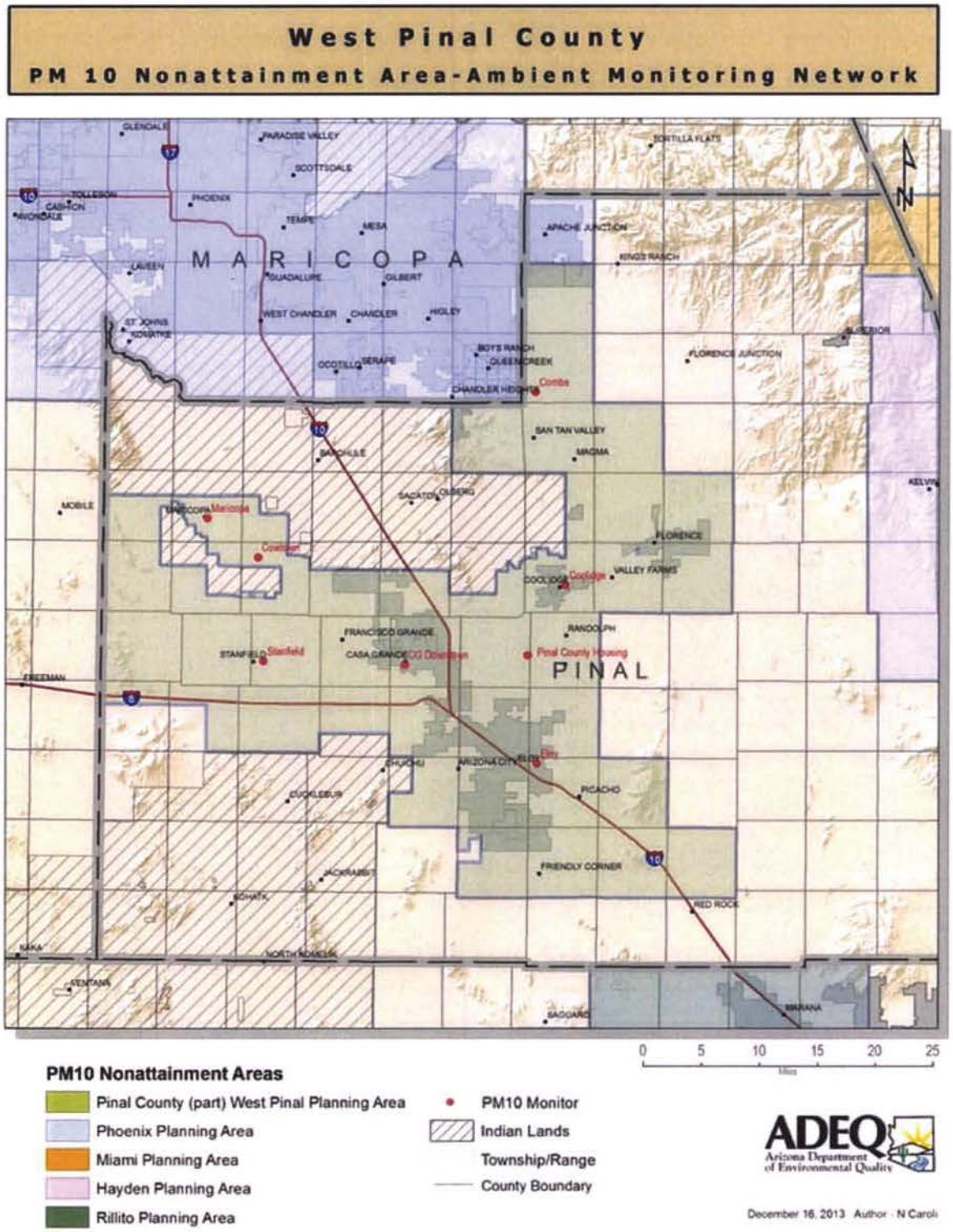
The information included in this document provides insight into the technical results of the emission inventory and control measure effectiveness determination. ADEQ is required to model attainment of the NAAQS by 2018 relying on controls codified into rule. To meet this requirement, ADEQ relied upon those controls included in the Arizona Administrative Code R18-2-610.03 (Commercial crop farm controls), Arizona Administrative Code R18-2-611.03(E) (Commercial beef feedlot controls), and Arizona Administrative Code R18-2-612.01 (Irrigation district controls). These controls were modeled to produce the emission reductions required to meet attainment for seven different design day scenarios (three stagnation and four high-wind scenarios). These controls resulted in total nonattainment area, annual PM_{10} emission reductions of 22,424.4 tons/year.

EPA further requires contingency controls be available to meet annual emission reductions equivalent to one year of reasonable further progress (RFP) for the nonattainment area. As the nonattainment area will need to meet attainment in 2018 (i.e., over the next three years, 2016-2018), these contingency controls must exceed 7,474.8 tons (7,474.8 tons = 22,424.4 tons / 3 years). To meet the contingency requirement, ADEQ is relying on Arizona Administrative Code R18-2-611.03 (Commercial dairy controls) as well as the proposed rule changes included in PCAQCD Code of Regulations §4-3-160, -170, -180, and -190 (Construction controls) and PCAQCD Code of Regulations §4-1-010, -015, -020, -030, -040, -045, -050, and -060 (General fugitive dust controls).

Finally, ADEQ is required to calculate a mobile vehicle emissions budget (MVEB) for the nonattainment area. This MVEB is derived from the nonattainment area, annual attainment emission inventory and was calculated by ADEQ as 28,542.5 tons/year. Analysis performed by ADEQ indicates that this MVEB will be adequate to meet the transportation conformity needs of the County for decades to come, assuming compliance with the proposed rule change included in PCAQCD Code of Regulations §4-1-030.4. (General fugitive dust rule, unpaved road controls).

Nonattainment Area

The following figure shows the location of air quality monitors and municipality boundaries within and surrounding the Pinal County PM_{10} nonattainment area.



Emission Inventory Sectors

Two primary scenarios produce PM_{10} emission in the Pinal County nonattainment area: 1) windblown dust emissions during high winds and 2) mechanical entrainment of dust into the atmosphere from human activities. The magnitude of windblown dust emissions depend on land stability and wind speed. The magnitude of activity related emissions are dependent on the degree to which the activity entrains PM_{10} and the duration of the activity. Table 1 and Table 2 present the source categories investigated for these two primary emission production scenarios.

Table 1 Land Use Categories for Windblown Emissions

Developed Urban Lands
Developed Rural Lands (low density residential)
Paved Roads
Unpaved Roads
Cleared Areas
Residential Construction
Dairies
CAFOs
Desert Shrubland
Agriculture
Commercial Construction
Other
Site Development

Table 2 Activity-Based Emission Source Categories

Ag Fields (Harvesting & Tilling)
CAFOs
Dairies
Paved Road
Unpaved Road (Public, Private, Agricultural, and Trails)
Nonroad
Railroad
Construction (Residential, Commercial, Road, and Site Development)
Permitted Sources
Fuel Combustion (Residential)
Fires (Agricultural, Wildfires, and Prescribed Fires)
Open Burning (Residential, Commercial, and Land Clearing)
Unpaved Parking

Pinal County PM_{10} Nonattainment Area Controls

Table 3 and Table 4 present the rules, either codified or proposed, to be implemented in Pinal County to reach attainment and meet contingency requirements and their associated annual emissions.

Table 3 Summary of Attainment Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-610.03	Commercial crop farms (including tillage, ground operation and harvest, commercial farm roads, and noncropland)	January 1, 2016	21,420.6
Arizona Administrative Code, R18-2-611.03(E)	Commercial beef cattle feedlot	January 1, 2016	281.3
Arizona Administrative Code, R18-2-612.01	Irrigation Districts	January 1, 2016	722.3
Total			22,424.2

Table 4 Summary of Contingency Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-611.03	Commercial dairy operations	January 1, 2016	101.2
PCAQCD Code of Regulations, §4-3-160, -170, -180, and -190	Permitted construction projects	January 1, 2016	4,679.4
PCAQCD Code of Regulations, §4-1-010, -015, -020, -030, -040, -045, -050, and -060	Several prescribed area sources of fugitive dust, including vacant lots and other open areas, roads, and other traffic areas.	Effective January 1, 2016, with some controls being implemented progressively	2,962.3
Total			7,742.9

Design Days (Attainment Demonstration)

With the implementation of the controls listed in Table 3, ADEQ is able to model attainment for the seven design days in 2018. Observed (2008) and projected modeled impacts (2018 and 2018 attainment) are presented in Table 5.

Table 5: Design Day Concentrations: 2008, Projected 2018, and Projected Controlled 2018

Year	Design day		Design value (µg/m³)	
2008	Stagnation	Cowtown	244.5	Monitor observations
		Pinal County Housing	178.0	
		Stanfield	162.0	
	High-Wind	Cowtown	168.3	
		Maricopa	159.4	
		Pinal County Housing	264.9	
		Stanfield	178.6	
2018	Stagnation	Cowtown	188.2	Modeled projections
		Pinal County Housing	179.5	
		Stanfield	197.6	
	High-Wind	Cowtown	165.2	
		Maricopa	139.8	
		Pinal County Housing	263.2	
		Stanfield	186.8	
2018 - Attainment	Stagnation	Cowtown[1]	152.3	Modeled projections
		Pinal County Housing[1]	154.8	
		Stanfield[1]	154.7	
	High-Wind	Cowtown	122.1	
		Maricopa	124.2	
		Pinal County Housing	135.7	
		Stanfield	112.6	

[1] Design values are rounded to two significant figures for determination of NAAQS attainment. As such, any value < 155 µg/m³ is rounded down to 150 µg/m³ and will attain the NAAQS.

Annual Emission Reductions

Sector		Base 2008 Emissions Inventory (TPY)	Base 2018 Emissions Inventory (TPY)	Attainment 2018 Emissions Inventory (TPY)	Post-contingency 2018 Emissions Inventory (TPY)
Windblown dust	Developed Urban Lands	200.7	248.1	248.1	192.9
	Developed Rural Lands (low density residential)	1,959.7	1,959.7	1,959.7	1,895.6
	Unpaved Roads (including Ag roads)	4,688.6	4,657.0	3,809.1	3,800.0
	Cleared Areas	398.1	457.0	457.0	325.7
	Residential Construction	1,302.4	837.5	837.5	430.5
	Dairies	449.6	449.6	449.6	384.2
	CAFOs	273.7	155.2	125.3	125.3
	Desert Shrubland	38,276.7	38,276.7	38,276.7	36,709.1
	Agriculture	19,510.1	19,510.1	7,122.0	7,122.0
	Commercial Construction	686.4	441.4	441.4	216.3
	Other	4,243.9	4,243.9	4,243.9	4,239.5
	Site Development	858.7	552.2	552.2	278.9
	Subtotal	72,848.6	71,788.4	58,522.5	55,720.0
Activity-based emissions	Ag Fields - Harvesting	312.9	312.9	207.1	207.1
	Ag Fields - Tilling	2,540.3	2,540.3	1,658.0	1,658.0
	CAFOs	2,614.3	1,620.6	1,369.2	1,369.2
	Paved Road	1,180.7	1,408.0	1,408.0	1,402.3
	Unpaved Road	43,656.2	45,688.6	37,769.6	36,716.9
	Fuel Combustion	28.3	34.8	34.8	34.8
	Fires	19.9	22.2	22.2	22.2
	Open Burning	13.6	16.7	16.7	16.7
	Nonroad	121.3	155.6	155.6	155.6
	Railroad	85.9	45.5	45.5	45.5
	Construction	12,955.3	8,471.9	8,471.9	4,702.9
	Dairy	186.6	184.0	184.0	148.2
	Permitted Sources	781.3	781.3	781.3	781.3
	Unpaved Parking	251.5	251.5	251.5	172.5
	Subtotal	64,748.1	61,533.9	52,375.4	47,433.2
Total		137,596.7	133,322.3	110,897.9	103,153.2

Motor Vehicle Emissions Budget

The MVEB presented in Table 6 considers the combined contributions of motor vehicles traveling roads within the nonattainment area, as well as the emissions from construction projects on those roads. Emissions from non-road vehicles are not included in the budget, nor are emissions produced by wind traveling over the roads and construction sites. Emissions from certain commercial roads, which are expected to remain fairly constant from one year to the next, are also omitted. The budget is established for annual emissions totals, and anticipates various changes in traffic, fleet characteristics, road work, and new rules and regulations up through calendar year 2018.

Table 6: Annual MVEB by Source Sector

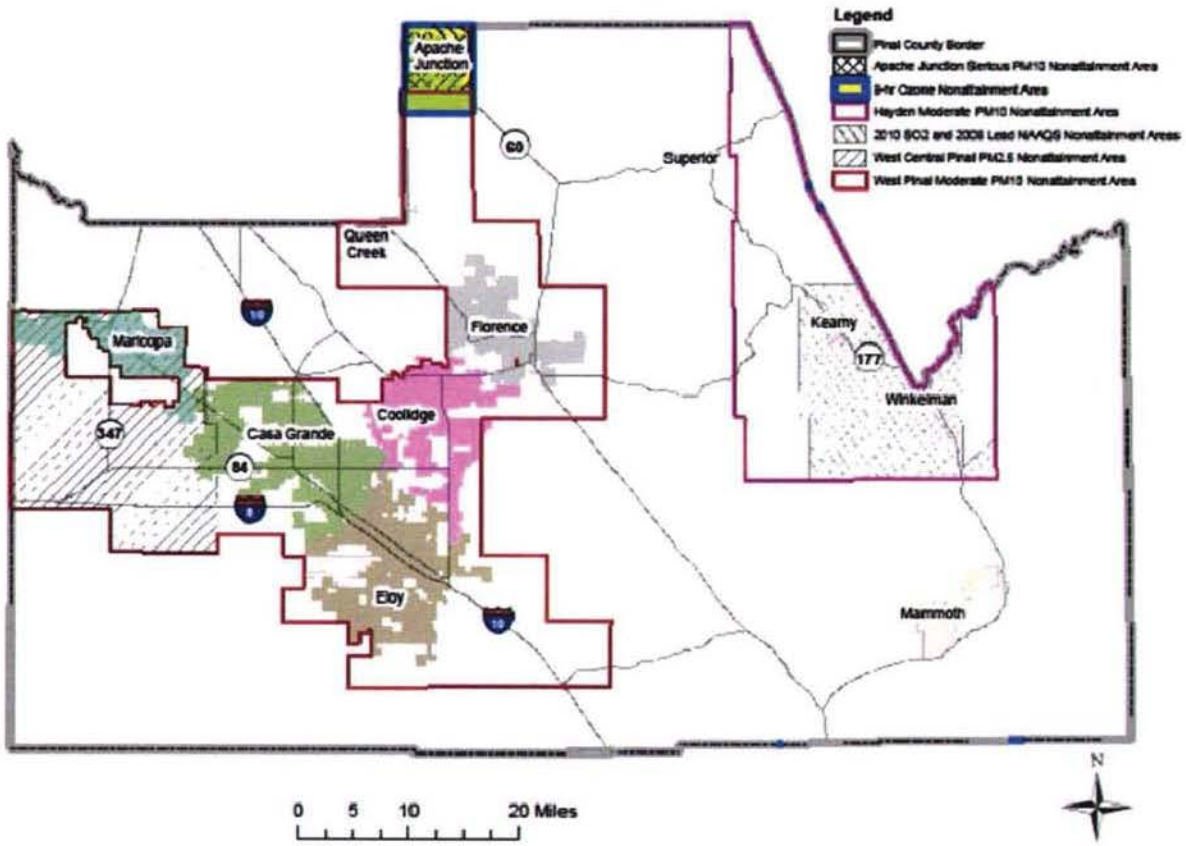
Source	Tons of PM_{10}
Exhaust, tire-, & brake-wear (paved and unpaved roads)	173.7
Reentrained unpaved road dust (including public and private roads, excluding trials and agricultural roads)	27,016.7
Reentrained paved road dust	1,211.1
Road construction/maintenance	140.9
Total	28,542.5

West Pinal PM10 Nonattainment Area Construction Dust Rule

Kale Walch

9/1/15

Pinal County Nonattainment Areas



1/6/2015
S:\Arcview\Pinal County AQ Maps\PC Nonattainment areas 2015.mxd

What triggers a dust permit in Pinal County

- Any property improvement that disturbs more than 0.1 of an acre
- Pinal County will have an Apache Junction construction dust rule, a West Pinal construction dust rule and the historic (general) construction rule for the rest of the county
- Application forms, recordkeeping forms and guidance is available at http://www.pinalcountyaz.gov/AirQuality/Dust/Pages/home.aspx

West Pinal Construction Dust Rule Highlights Applicability

- No required training (only required in Apache Junction area)
- Subcontractor registration not required(only required in Apache Junction area)
- Multiple subcontractors can obtain permits for the same sites
- None of the Pinal County Construction dust rules apply at sites that permit earthwork activities under an industrial source permit.
  - If the Industrial source is new some site prep activities will trigger a dust permit, i.e. bulldozing a previously undisturbed site. Check with PCAQCD.
- Road maintenance typically does not require a dust permit
  - If the road surface is ground down to soil a dust permit is required
  - Applying chip seal or paving to an existing dirt road triggers a dust permit

West Pinal Construction Dust Rule Highlights Compliance Assessment

- Do not exceed 20 % opacity on the property
  - Assessed via EPA Method 9, 203A or 203C
- Stabilize any disturbed surface
  - Assessed via the drop ball test
  - Every other week inspections to ensure the work site is stabilized and applicable control measures are implemented

West Pinal Construction Dust Rule Highlights Large sites

- For sites 5 acres or larger
  - Install a project information sign
  - Install trackout control prior start of dust generating operations
  - For areas that have not had or will not have dust generating operations for more than 30 days
    - Erect signs or install physical barriers to limit trespass
  - Ensure site is stabilized the day leading up to and the day that is forecast to be high risk
    - Will have to sign up for forecast email
    - All applicable control measures are implemented and areas are stabilized or dust generating operations are ceased.

West Pinal Construction Dust Rule Highlights Application Process

- Sign up for dust forecast as part of the application process
- Provide a plot map during the application process
- Annual Block permits can be purchased by utility companies and government entities and governmental contractors
- Each original dust permit must cover a contiguous area (except block permits)
- Select at least one control measure for each dust generating operation
- Keep a copy of the dust permit onsite
- Renewed permits can be effective upon expiration of original permit
- Electronic submittal may be available in 2016

West Pinal Construction Dust Rule Highlights Recordkeeping and Reporting

- Keep records of every other week inspections
- Keep records of site wide inspections on the day leading up to and the day that is forecast to be high risk for dust emissions
- Record corrective actions
- Records must be available upon request
- Must notify PCAQCD within 30 days of project completion
- Records must be submitted within 30 days of permit termination
- PCAQCD will supply forms for all the above at http://www.pinalcountyaz.gov/AirQuality/Dust/Pages/home.aspx

West Pinal Construction Dust Rule Highlights Wind Exemptions

- Must keep records
- Must implement all control measures listed in the permit
- Must stabilize all disturbed surfaces
- Must cease dust generating operations until the opacity requirements are no longer being exceeded

  or;

- Maintain documentation that the dust generating operations are not the cause of the opacity observation, i.e. observations by a certified observer

Contact Information

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STATE OF ARIZONA }
COUNTY OF PINAL }

Affidavit of Publication

RUTH A. KRAMER first being duly sworn deposes and says: That he/she is a native born citizen of the United States of America, over 21 years of age, that I am an agent and/or publisher of the the Florence Reminder & Blade-Tribune, a weekly newspaper published at Florence, Pinal County, Arizona, on Thursday of each week; that a notice, a full, true and complete printed copy of which is hereunto attached, was printed in the regular edition of said newspaper, and not in a supplement thereto, for **ONE** consecutive issues. The first publication thereof having been on the **17TH**

day of **SEPTEMBER** A.D., **2015**

Second publication _____

Third publication _____

Fourth publication _____

Fifth publication _____

Sixth publication _____

FLORENCE REMINDER & BLADE-TRIBUNE

By Ruth Kramer
agent and/or publisher of the Florence Reminder & Blade-Tribune

Sworn to before me this 21st

day of September A.D., 2015

Catherine Ortiz

Notary Public in and for the County
of Pinal, State of Arizona

Official Seal
NOTARY PUBLIC
State of Arizona
County of Pinal
CATHERINE ORTIZ
My Comm. Expires 7-13-2018

Public Notice
Proposed Rulemaking
Board of Supervisors Public Hearing

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. The ultimate purpose of this rulemaking proposal will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

Ongoing violations of the PM10 (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal PM10 Nonattainment Area). A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification (i.e. emissions inventory) and solutions (i.e. rules) to the problem. The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM10 emissions inventory for the West Pinal PM10 Nonattainment Area. The top three emissions sources in the base year PM10 emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This rulemaking proposal addresses the construction fugitive dust emissions associated with development activities.

Given the obligatory nature of this rulemaking proposal, it has followed the rulemaking process defined in A.R.S. §§49-112.D and 49-471. The combined notice of proposed rulemaking and oral proceeding was published in the Arizona Administrative Register (AAR) on August 28, 2015 (found online at www.azsos.gov) which started the official 30-day public comment period (which ends at the close of business on September 28, 2015). The Oral Proceeding will take place at 1 p.m. on September 28, 2015 in the Ocotillo room of Building F of the county complex located at 31 N. Pinal St., Florence, AZ.). The oral proceeding provides a formal opportunity for the public to make comments on the rulemaking proposal to the Pinal County Air Quality Control Officer. The rulemaking proposal along with a summary of any comments received will be submitted to the Board of Supervisors for consideration and possible adoption. The date, time and location of the Board of Supervisors public hearing-of-adoption is October 28, 2015, 9:30 a.m. at the Pinal County Administrative Complex, *Board of Supervisors* Hearing Room located at 135 N. Pinal Street, Florence, AZ. 85132.

The agenda for the Board of Supervisors meeting on October 28, 2015 can be found online at http://pinalcountyaz.gov/bos/Pages/AngendaMinutes.aspx.

No. of publications: 1; date of publication: Sept. 17, 2015.

STATE OF ARIZONA
COUNTY OF PINAL } ss.

Affidavit of Publication

RUTH A. KRAMER first being duly sworn deposes and says: That he/she is a native born citizen of the United States of America, over 21 years of age, that I am an agent and/or publisher of the Casa Grande Dispatch, a daily newspaper published at Casa Grande, Pinal County, Arizona, Tuesday through Sunday of each week; that a notice, a full, true and complete printed copy of which is hereunto attached, was printed in the regular edition of said newspaper, and not in a supplement thereto, for ONE issues. The first publication thereof having been on the

17TH day of SEPTEMBER A.D., 2015

Second publication _____

Third publication _____

Fourth publication _____

Fifth publication _____

Sixth publication _____

CASA GRANDE DISPATCH

By Ruth A Kramer
agent and/or publisher of the Casa Grande Dispatch

Sworn to before me this 21st
day of September A.D., 2015
Catherine Ortiz
Notary Public in and for the County
of Pinal, State of Arizona

Official Seal
NOTARY PUBLIC
State of Arizona
County of Pinal
CATHERINE ORTIZ
My Comm. Expires 7-13-2018

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Board of Supervisors Public Hearing

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No. of publications: 1; date of publication: Sept. 17, 2015.

PINAL COUNTY DEPARTMENT OF DEVELOPMENT SERVICES
AIR QUALITY CONTROL DISTRICT
POST OFFICE BOX 987, FLORENCE, ARIZONA 85232

POSTING CERTIFICATION OF NOTICE

The undersigned hereby certifies that a copy of the attached notice was duly posted at:

(1) Pinal County Administration 1 – Bldg A Lobby on September 16th

(2) Pinal County Treasurer's Office – Bldg E on September 16th

(3) Pinal County Admin 3 – Bldg F Lobby on September 16th

(4) Justice Court – 400 S Central Ave on September 16th

(5) Pinal Co Clerk of the Court – 971 Jason Lopez Ci on September 16th

in accordance with the statement filed by the PINAL COUNTY AIR QUALITY CONTROL ADVISORY COUNCIL with the Clerk of the Pinal County Board of Supervisors.

Dated this 16th day of September, 2015

Tanya Palmos

Tanya R. Palmos
Secretary
Pinal County Air Quality Control District

Michael Sundblom
Air Quality Director

PINAL • COUNTY
wide open opportunity

Greg Stanley
County Manager

Public Notice

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31 North Pinal Street, Building F, PO Box 987 Florence, AZ 85232 T 520-866-6929 FREE 888-431-1311 F 520-866-6967 www.pinalcountyaz.gov

Scott DiBiase

om: Nelda Nunez
Sent: Friday, September 11, 2015 10:12 AM
To: 'Amanda McGennis'; 'Amy Courson'; Andrew Steckel (steckel.andrew@epa.gov); 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Bryant Powell (bpowell@ajcity.net)'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; Heidi Haggerty; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; 'hkrauss@ci.eloy.az.us'; Irene J. Higgs (ihiggs@scmpo.org); 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson (jimt@casagrandeaz.gov)'; 'jmehta@marana.com'; 'Jo Crumbaker (jcrumbaker@mail.maricopa.gov)'; 'Joe Sigg (joesigg@azfb.org)'; 'John Insalaco (jmason@ajcity.net)'; 'John Kross (john.kross@queencreek.org)'; 'Jon Post (jpost@marana.com)'; 'Joonwon Joo (jjoo@azdot.gov)'; 'Joseph Nagy - City of Eloy (jnagy@ci.eloy.az.us)'; 'Juan Ponce (publicworks@townofmammoth.com)'; 'Julia Gusse (julia.gusse@maricopa-az.gov)'; 'Karl Montoya (kmontoya@casagrandeaz.gov)'; 'Kazi Haque (kazi.haque@maricopa-az.gov)'; 'Kevin Boesch (kboesch@ladaz.com)'; 'Kevin Louis (klouis@casagrandeaz.gov)'; 'Kevin Wanttaja - Salrt River Project (kevin.wantaja@srpnet.com)'; 'khall@cagaz.org'; 'Larry Hawke - Pima County Department of Environmental Quality (larry.hawke@pima.gov)'; 'Larry Kirch (lkirch@ajcity.net)'; 'ldunagan@ci.eloy.az.us'; 'Leroy Williams (williams@gilanet.net)'; 'lfitzgibbons@casagrandeaz.gov'; 'Lindy Bauer (lbauer@mag.maricopa.gov)'; 'Lisa Garcia (lisa.garcia@florenceaz.gov)'; 'Louis Manuel Jr (lmanuel@ak-chin.nsn.us)'; 'Maeve Clancy (clancy.maeve@epa.gov)'; 'Margaret Gaston (townmanager@superior-arizona.com)'; Marina Mejia; 'mark.eckhoff@florenceaz.gov'; 'Martin Scribner'; 'Marvin Brown (marvin.brown@maricopa-az.gov)'; 'Mary Kortsen (mkortsen@casagrandeaz.gov)'; 'massey.eric@azdeq.gov'; 'Matt Herman (mherman@casagrandeaz.gov)'; 'Michael Curtis (mcurtis401@aol.com)'; 'Michael Jackson (cactus2yelap@hotmail.com)'; 'Michael Wesley (mwesley@khov.com)'; 'Morgan Holmes (mholmes@cgsuslaw.com)'; 'mrichardson@asarco.com'; 'nancy.nesky@aps.com'; 'Nick Simonetta (nick@pivotalpolicyconsulting.com)'; 'Norman Hinz (nhinz@pinalfeeding.com)'; 'Ole Solberg (ole@solbergengineering.com)'; 'Patrick Bray (pbray@arizonabeef.org)'; 'Patti Comerford (pcomerford@marana.com)'; 'Paul Jepson (paul.jepson@maricopa-az.gov)'; 'Peggy Chapados (peggy.chapados@maricopa-az.gov)'; Pete Rios; 'Phil McNeely (pmcneely@mail.maricopa.gov)'; 'Ralph Varela (rvarela@casagrandeaz.gov)'; 'Ramona Simpson (ramona.simpson@queencreek.org)'; 'Randy Schroeder (info@envalue.us)'; 'Richard Grimaldi (richard.grimaldi@pima.gov)';

To: 'Rick Lavis - Arizona Cotton Growers Association ()'; 'rios.gerardo@epamail.epa.gov'; 'rmiller@coolidgeaz.com'; 'Robert Boyle (mcclintockdairy@hotmail.com)'; 'Robert Flatley (bobf@coolidgeaz.com)'; 'Robert Goodhue (bob.goodhue@maricopa-az.gov)'; 'Rolf von Oppenfeld (rvo@testlaw.com)'; 'Roxanne Smith (roxannesmith@orbitelcom.com)'; 'Roxanne Ziegler (rziegler@marana.com)'; 'Rudy Mix (rudy.mix@gric.nsn.us)'; 'Russell Bowers (rusty@azrockproducts.org)'; 'Ryan Benavides (rbenavides@marana.com)'; 'Ryan Mahoney (rmahoney@marana.com)'; 'sam_hosler@msn.com'; 'Sandie Smith (sandie@pinalpartnership.com)'; 'Sandy Bahr (sandy.bahr@sierraclub.org)'; 'sarah.walters@pima.gov'; 'Scott Weaver (scott.weaver@erm.com)'; 'Shane Kieso (skiesow@ajcity.net)'; 'Spencer Kamps (kampss@hbaca.org)'; 'Steve Cheslak (scheslak@marana.com)'; Steve Miller; 'Steve Murray (smurray@asarco.com)'; 'Steve Trussell (steve@azrockproducts.org)'; 'Steven Johnson - Gila River Indian Community (steven.johnson@gric.nsn.us)'; 'Susanna Struble (sstruble@coolidgeaz.com)'; 'thompson5155@msn.com'; 'tim.sturdavant@hexcel.com'; Todd House; 'tom.rankin@florenceaz.gov'; Travis Ashbaugh; 'Troy White (troy.white@queencreek.org)'; 'Ursula Nelson (ursula.nelson@pima.gov)'; 'Walter Ritcher (walter.ritcher@swgas.com)'; 'Wavalene Romero - Tohono O'odham Nation (wavalene.romero@tonation-nsn.gov)'; 'Wayne Costa (wayne.costa@florenceaz.gov)'; 'Wendy Crites (wmcrites@srpnet.com)'; 'William Sullivan (wsullivan@cgsuslaw.com)'; 'Yvonne Everlund (yes4change@yahoo.com)'

Cc: Michael Sundblom; Scott DiBiase

Subject: Pinal County Air Quality rulemakings - Public Notice Board of Supervisors Public Hearing October 28, 2015

Dear Stakeholder,

The rulemakings for the draft general fugitive dust and construction fugitive dust rules are ongoing. The rulemaking docket openings and combined notices of proposed rulemakings and oral proceedings were published in the Arizona Administrative Register (AAR) on August 28, 2015 (online at http://apps.azsos.gov/public_services/register/2015/35/28_county_notices.pdf). The Oral Proceedings for both rulemakings take place on September 28th, see below for details. Anyone that is interested in providing comments on the draft rules may do so by either emailing them to scott.dibiase@pinalcountyaz.gov or mailing them to Pinal County Air Quality, Attention: Scott DiBiase, 31 North Pinal St., Building F, P.O. Box 987, Florence, AZ. 85132 or providing written or oral comments at the respective oral proceeding on September 28th (see oral proceeding details below). The public comment period is ongoing and will close at the close of business on September 28th.

General fugitive dust oral proceeding – September 28, 2015, 10 a.m., 31 N. Pinal St., Building F, Ocotillo room.

Construction fugitive dust oral proceeding - September 28, 2015, 1 p.m., 31 N. Pinal St., Building F, Ocotillo room.

The last step in the rulemaking process is a public hearing with the Pinal County Board of Supervisors (BOS). The public notices (general fugitive dust & construction) for the Board of Supervisors public hearing on October 28, 2015 is attached. It is at the BOS public hearing where the BOS will be presented with the draft rules along with any comments received and will decide whether or not to adopt the proposed rules. The BOS public hearing is the final opportunity for the general public to make comments.

Please let me know if you have any questions and/or comments.

Sincerely,

Scott DiBiase
Pinal County Air Quality

Scott DiBiase

From: Scott DiBiase
Sent: Tuesday, September 15, 2015 7:52 AM
To: 'Amanda McGennis'; 'Amy Courson'; Andrew Steckel (steckel.andrew@epa.gov); 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Bryant Powell (bpowell@ajcity.net)'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; Heidi Haggerty; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; 'hkrauss@ci.eloy.az.us'; Irene J. Higgs (ihiggs@scmpo.org); 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson (jimt@casagrandeaz.gov)'; 'jmehta@marana.com'; 'Jo Crumbaker (jcrumbaker@mail.maricopa.gov)'; 'Joe Sigg (joesigg@azfb.org)'; 'John Insalaco (jmason@ajcity.net)'; 'John Kross (john.kross@queencreek.org)'; 'Jon Post (jpost@marana.com)'; 'Joonwon Joo (jjoo@azdot.gov)'; 'Joseph Nagy - City of Eloy (jnagy@ci.eloy.az.us)'; 'Juan Ponce (publicworks@townofmammoth.com)'; 'Julia Gusse (julia.gusse@maricopa-az.gov)'; 'Karl Montoya (kmontoya@casagrandeaz.gov)'; 'Kazi Haque (kazi.haque@maricopa-az.gov)'; 'Kevin Boesch (kboesch@ladaz.com)'; 'Kevin Louis (klouis@casagrandeaz.gov)'; 'Kevin Wanttaja - Salrt River Project (kevin.wantaja@srpnet.com)'; 'khall@cagaz.org'; 'Larry Hawke - Pima County Department of Environmental Quality (larry.hawke@pima.gov)'; 'Larry Kirch (lkirch@ajcity.net)'; 'ldunagan@ci.eloy.az.us'; 'Leroy Williams (williams@gilanet.net)'; 'lfitzgibbons@casagrandeaz.gov'; 'Lindy Bauer (lbauer@mag.maricopa.gov)'; 'Lisa Garcia (lisa.garcia@florenceaz.gov)'; 'Louis Manuel Jr (lmanuel@ak-chin.nsn.us)'; 'Maeve Clancy (clancy.maeve@epa.gov)'; 'Margaret Gaston (townmanager@superior-arizona.com)'; Marina Mejia; 'mark.eckhoff@florenceaz.gov'; 'Martin Scribner'; 'Marvin Brown (marvin.brown@maricopa-az.gov)'; 'Mary Kortsen (mkortsen@casagrandeaz.gov)'; 'massey.eric@azdeq.gov'; 'Matt Herman (mherman@casagrandeaz.gov)'; 'Michael Curtis (mcurtis401@aol.com)'; 'Michael Jackson (cactus2yelap@hotmail.com)'; 'Michael Wesley (mwesley@khov.com)'; 'Morgan Holmes (mholmes@cgsuslaw.com)'; 'mrichardson@asarco.com'; 'nancy.nesky@aps.com'; 'Nick Simonetta (nick@pivotalpolicyconsulting.com)'; 'Norman Hinz (nhinz@pinalfeeding.com)'; 'Ole Solberg (ole@solbergengineering.com)'; 'Patrick Bray (pbray@arizonabeef.org)'; 'Patti Comerford (pcomerford@marana.com)'; 'Paul Jepson (paul.jepson@maricopa-az.gov)'; 'Peggy Chapados (peggy.chapados@maricopa-az.gov)'; Pete Rios; 'Phil McNeely (pmcneely@mail.maricopa.gov)'; 'Ralph Varela (rvarela@casagrandeaz.gov)'; 'Ramona Simpson (ramona.simpson@queencreek.org)'; 'Randy Schroeder (info@envalue.us)'; 'Richard Grimaldi (richard.grimaldi@pima.gov)';

To: 'Rick Lavis - Arizona Cotton Growers Association ()'; 'rios.gerardo@epamail.epa.gov'; 'rmiller@coolidgeaz.com'; 'Robert Boyle (mcclintockdairy@hotmail.com)'; 'Robert Flatley (bobf@coolidgeaz.com)'; 'Robert Goodhue (bob.goodhue@maricopa-az.gov)'; 'Rolf von Oppenfeld (rvo@testlaw.com)'; 'Roxanne Smith (roxannesmith@orbitelcom.com)'; 'Roxanne Ziegler (rziegler@marana.com)'; 'Rudy Mix (rudy.mix@gric.nsn.us)'; 'Russell Bowers (rusty@azrockproducts.org)'; 'Ryan Benavides (rbenavides@marana.com)'; 'Ryan Mahoney (rmahoney@marana.com)'; 'sam_hosler@msn.com'; 'Sandie Smith (sandie@pinalpartnership.com)'; 'Sandy Bahr (sandy.bahr@sierraclub.org)'; 'sarah.walters@pima.gov'; 'Scott Weaver (scott.weaver@erm.com)'; 'Shane Kieso (skiesow@ajcity.net)'; 'Spencer Kamps (kampss@hbaca.org)'; 'Steve Cheslak (scheslak@marana.com)'; Steve Miller; 'Steve Murray (smurray@asarco.com)'; 'Steve Trussell (steve@azrockproducts.org)'; 'Steven Johnson - Gila River Indian Community (steven.johnson@gric.nsn.us)'; 'Susanna Struble (sstruble@coolidgeaz.com)'; 'thompson5155@msn.com'; 'tim.sturdavant@hexcel.com'; Todd House; 'tom.rankin@florenceaz.gov'; Travis Ashbaugh; 'Troy White (troy.white@queencreek.org)'; 'Ursula Nelson (ursula.nelson@pima.gov)'; 'Walter Ritcher (walter.ritcher@swgas.com)'; 'Wavalene Romero - Tohono O'odham Nation (wavalene.romero@tonation-nsn.gov)'; 'Wayne Costa (wayne.costa@florenceaz.gov)'; 'Wendy Crites (wmcrites@srpnet.com)'; 'William Sullivan (wsullivan@cgsuslaw.com)'; 'Yvonne Everlund (yes4change@yahoo.com)'

Cc: Michael Sundblom

Subject: RE: Pinal County Air Quality rulemakings - Public Notice Board of Supervisors Public Hearing October 28, 2015

Attachments: PCAQCD 2015 Public Notice CONSTRUCTION fugitive dust rulemaking BOS Publ....docx; PCAQCD 2015 Public Notice GENERAL FUGITIVE DUST rulemaking BOS Public He....docx

ear Stakeholders,

Please see the attached public notices for the BOS Public Hearing on October 28, 2015. They were inadvertently left off the email sent last Friday.

Scott DiBiase

From: Nelda Nunez
Sent: Friday, September 11, 2015 10:12 AM
To: 'Amanda McGennis'; 'Amy Courson'; Andrew Steckel (steckel.andrew@epa.gov); 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Bryant Powell (bpowell@ajcity.net)'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; Heidi Haggerty; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; krauss@ci.eloy.az.us'; Irene J. Higgs (ihiggs@scmpo.org); 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson

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Cc: Michael Sundblom; Scott DiBiase
Subject: Pinal County Air Quality rulemakings - Public Notice Board of Supervisors Public Hearing October 28, 2015

Dear Stakeholder,

The rulemakings for the draft general fugitive dust and construction fugitive dust rules are ongoing. The rulemaking docket openings and combined notices of proposed rulemakings and oral proceedings were published in the Arizona Administrative Register (AAR) on August 28, 2015 (online at http://apps.azsos.gov/public_services/register/2015/35/28_county_notices.pdf). The Oral Proceedings for both rulemakings take place on September 28th, see below for details. Anyone that is interested in providing comments on the draft rules may do so by either emailing them to scott.dibiase@pinalcountyaz.gov or mailing them to Pinal County Air Quality, Attention: Scott DiBiase, 31 North Pinal St., Building F, P.O. Box 987, Florence, AZ. 85132 or providing written or oral comments at the respective oral proceeding on September 28th (see oral proceeding details below). The public comment period is ongoing and will close at the close of business on September 28th.

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Construction fugitive dust oral proceeding - September 28, 2015, 1 p.m., 31 N. Pinal St., Building F, Ocotillo room.

The last step in the rulemaking process is a public hearing with the Pinal County Board of Supervisors (BOS). The public notices (general fugitive dust & construction) for the Board of Supervisors public hearing on October 28, 2015 is attached. It is at the BOS public hearing where the BOS will be presented with the draft rules along with any comments received and will decide whether or not to adopt the proposed rules. The BOS public hearing is the final opportunity for the general public to make comments.

Please let me know if you have any questions and/or comments.

Sincerely,

Scott DiBiase
Pinal County Air Quality
(520)866-6969
Scott.dibiase@pinalcountyaz.gov

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
wide open opportunity

Public Notice

Proposed Rulemaking

Board of Supervisors Public Hearing

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. The ultimate purpose of this rulemaking proposal will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

Ongoing violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal PM_{10} Nonattainment Area). A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification (i.e. emissions inventory) and solutions (i.e. rules) to the problem. The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area. The top three emissions sources in the base year PM_{10} emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This rulemaking proposal addresses the construction fugitive dust emissions associated with development activities.

Given the obligatory nature of this rulemaking proposal, it has followed the rulemaking process defined in A.R.S. §§49-112.D and 49-471. The combined notice of proposed rulemaking and oral proceeding was published in the Arizona Administrative Register (AAR) on August 28, 2015 (found online at www.azsos.gov) which started the official 30-day public comment period (which ends at the close of business on September 28, 2015). The Oral Proceeding will take place at 1 p.m. on September 28, 2015 in the Ocotillo room of Building F of the county complex located at 31 N. Pinal St., Florence, AZ.). The oral proceeding provides a formal opportunity for the public to make comments on the rulemaking proposal to the Pinal County Air Quality Control Officer. The rulemaking proposal along with a summary of any comments received will be submitted to the Board of Supervisors for consideration and possible adoption. The date, time and location of the Board of Supervisors public hearing-of-adoption is October 28, 2015, 9:30 a.m. at the Pinal County Administrative Complex, Board of Supervisors Hearing Room located at 135 N. Pinal Street, Florence, AZ. 85132.

The agenda for the Board of Supervisors meeting on October 28, 2015 can be found online at http://pinalcountyaz.gov/bos/Pages/AngendaMinutes.aspx.

AIR QUALITY CONTROL DISTRICT
31 North Pinal Street, Building F, PO Box 987 Florence, AZ 85232 T 520-866-6929 **FREE** 888-431-1311 F 520-866-6967 www.pinalcountyaz.gov

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
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Construction Fugitive Dust Proposed Rulemaking
Oral Proceeding
Monday, September 28, 2015
1 PM
31 N. Pinal Street, Florence, AZ.
Building F, Ocotillo Room

1. Welcome & Introductions

2. Background

3. Proposed Rule

4. Comments

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PINAL COUNTY AIR QUALITY CONTROL DISTRICT
31 N. PINAL ST., FLORENCE, ARIZONA 85132

DRAFT CONSTRUCTION FUGITIVE DUST RULE ORAL PROCEEDING
SEPTEMBER 28, 2015 1 P.M. OCOTILLO ROOM, BUILDING F

Name	Organization	Address	Phone Number	Email
Kate Walch	PCAQCD	P.O. Box 987 Florence AZ 85132	520-866-6860	kate.walch@pinalcountyaz.gov
Scott DiBiase	"	"	520 866 6369	Scott.dibiase@pinalcountyaz.gov

6. Public Comment

Development Services

Michael Sundblom
Air Quality Director

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Greg Stanley
County Manager

To: File
From: Scott DiBiase
Date: 12/2/15
Re: Comments for West Pinal PM_{10} nonattainment area construction fugitive dust rulemaking

The West Pinal PM_{10} Nonattainment area construction fugitive dust rule Notice of Rulemaking Docket Opening (21 A.A.R. 1715) and combined Notice of Proposed Rulemaking and Notice of Oral Proceeding (21 A.A.R. 1716) were published in the Arizona Administrative Register (A.A.R.) on August 28, 2015. This formally opened the rulemaking public comment period. The public notice was also posted on the Pinal County Air Quality website and posted in County buildings. The public comment period ended at the close of business on September 28, 2015. No comments were received.

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7. Evidence of Legal Adoption

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AGENDA ITEM

October 28, 2015 ADMINISTRATION BUILDING A
FLORENCE, ARIZONA

REQUESTED BY: Mike Sundblom/Greg Stanley

Funds #: 86

Dept. #: 314018

Dept. Name: Air Quality

Director: Mike Sundblom

BRIEF DESCRIPTION OF AGENDA ITEM AND REQUESTED BOARD ACTION:

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ1, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from construction activity. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes.

BRIEF DESCRIPTION OF THE FISCAL CONSIDERATIONS AND/OR EXPECTED FISCAL IMPACT OF THIS AGENDA ITEM:

BRIEF DESCRIPTION OF THE EXPECTED PERFORMANCE IMPACT OF THIS AGENDA ITEM:

MOTION:

Approve as presented.

History

Time	Who	Approval
10/15/2015 3:13 PM	County Attorney	Yes
10/15/2015 3:15 PM	Air Quality	Yes
10/16/2015 9:14 AM	County Manager	Yes
10/22/2015 10:54 AM	Clerk of the Board	Yes

ATTACHMENTS:

Click to download

- Resolution
- Concise Explanatory Statement

When recorded return to:
Clerk of the Board
Pinal County
P.O. Box 827
Florence, Arizona 85232

PINAL COUNTY BOARD OF SUPERVISORS
RESOLUTION NO. 102815-AQ1
PINAL COUNTY AIR QUALITY CONTROL DISTRICT

A RESOLUTION OF THE BOARD OF SUPERVISORS OF PINAL COUNTY, ADOPTING CERTAIN REVISIONS TO THE PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AND REQUESTING THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY SUBMIT THE REVISIONS TO THE ENVIRONMENTAL PROTECTION AGENCY AS AN ELEMENT OF THE ARIZONA STATE IMPLEMENTATION PLAN.

WHEREAS, the Pinal County Board of Supervisors ("Board") is empowered under A.R.S. §49-479 to adopt rules for the purpose of controlling the release of air contaminants within the County;

WHEREAS, ongoing PM_{10} exceedances in Pinal County resulted in a July 2, 2012 Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal Moderate PM_{10} Nonattainment Area – defined in 40 CFR 81.303).;

WHEREAS, the base year (2008) PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area quantified construction emissions as a significant source category;

WHEREAS, Clean Air Act requirements (§172(c)) include developing control measures that reduce emissions from significant source categories;

WHEREAS, Pinal County in coordination with stakeholders, EPA and Arizona Department of Environmental Quality (ADEQ) developed a West Pinal PM_{10} Nonattainment area construction fugitive dust rule that provides the necessary control measures to reduce PM_{10} emissions attributed to construction activities;

WHEREAS, to the extent applicable, the District has complied with the notice-publication and other public notification requirements of A.R.S. §§49-471.04 and 49-479, and 40 C.F.R. §51-102, including a combined notice of proposed rulemaking and oral proceeding published at 21 A.A.R. 1716 (8/28/15);

WHEREAS, the Board's preference regarding inclusion of those revised rules as elements of the Arizona State Implementation Plan, are also set forth below in the proposed revision to §1-1-105;

WHEREAS, the elements of the final proposed changes in the County's air quality rules are set forth below in full;

THEREFORE, FOR THE PURPOSE OF PROTECTING AND PRESERVING THE QUALITY OF AIR WITHIN THE COUNTY IN A SENSIBLE AND ORDERLY MANNER, IT IS HEREBY RESOLVED BY THE BOARD TO:

1. **Adopt the following revisions, additions and deletions to the Pinal County Air Quality Control District Code of Regulations, the full text of which follows the indicated field markers.**
2. **Direct Pinal County Air Quality to submit the adopted rules (excluding §1-1-105) to the Arizona Department of Environmental Quality (ADEQ) with the request that they be submitted to the Environmental Protection Agency (EPA) for inclusion in the Arizona State Implementation Plan (SIP).**

***

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).

h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)
      ii. §4-3-170 (As amended 10/28/15)
      iii. §4-3-180 (As amended 10/28/15)
      iv. §4-3-190 (As amended 10/28/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
   1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
   2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
   1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
   2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
      a. §111 of the Clean Air Act; or
      b. Title IV of the 1990 amendments to the Clean Air Act; or
      c. Title VI of the 1990 amendments to the Clean Air Act; or
      d. Any section of this Code that is not a part of the SIP;
   3. Operate as an element of the SIP, at least insofar as they impose a "fee";
   4. Operate as an element of the SIP, at least insofar as they require a "certification";
   5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";

6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

This definition excludes those permanently stabilized areas that have:

a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
b. Been paved or otherwise covered by a permanent structure; or
c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

a) Earthmoving activities
b) Land clean-up, leveling, back filling
c) Drilling
d) Construction
e) Demolition
f) Bulk material handling, storage and/or transporting operations
g) Operation of motorized machinery used in Construction
h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.

9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.

11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of

soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.

21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.
23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.
28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.
    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:
        i. Trenches less than four feet in depth, that exceed a length of 726 feet;
        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:
    1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the

work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:

1. Install suitable trackout control prior to the start of dust generating operations;
2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:

   a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or

   b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
   a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
   b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for dust generating operations associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.

v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.

vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:

a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the-completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.

f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:

   i. Project Name

   ii. Name and phone number of person(s) responsible for conducting project

   iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:

   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

IN WITNESS WHEREOF, the undersigned, in accord with the vote of the Pinal County Board of Supervisors as duly reflected in the minutes of the Board meeting, have executed this document on behalf of the Board of Supervisors on this _____ day of _____, 2015.

PINAL COUNTY, a political subdivision of the State of Arizona,

By: _____
Chairwoman of the Board of Supervisors

ATTEST: _____
Clerk of the Board of Supervisors

APPROVED AS TO FORM:

Lando Voyles
Pinal County Attorney

By: _____
Deputy County Attorney

Pinal County Air quality

Concise Explanatory Statement

Pertaining to Proposed Revisions to the Pinal County Air Quality Control District Code of Regulations Scheduled for Consideration by the Board of Supervisors on October 28, 2015

See 21 A.A.R. Pg. 11715 (8/28/15) for Background

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1. Pinal County Air Quality proposed a number of additions to local air quality rules related to construction fugitive dust emissions in the West Pinal moderate PM_{10} Nonattainment Area. The notice of docket opening and combined notice of proposed rulemaking and oral proceeding were published in the Arizona Administrative Register on August 28, 2015 (See 21 A.A.R. 1715).

2. The A.A.R. notice scheduled an oral proceeding before the Control Officer for September 28, 2015, and scheduled a close to the public comment period at the close of business on that day.

   No verbal or written comments were received.

3. Notwithstanding the absence of any comment, further review by Air Quality staff of the changes proposed in the A.A.R. notice has identified a number of additional ministerial and typographical changes that are required. Those changes, none of which are substantive in nature, include the following:
   - For clarification purposes, Trackout control device in §4-3-170.4, §4-3-170.23 and §4-3-180.B.1 were changed to trackout control.
   - §4-3-170.4 – Added "For all work sites…" to the description of trackout control (see underlined version below), in order to clarify that all work sites are required to clean up trackout when it extends a cumulative distance of 50 linear feet or more as soon as practicable, but in any case, by the end of the work day. .

     <u>Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.</u>

   - For clarification purposes, in §4-3-180.C.1.b added "Work sites 5 acres or larger" to the requirement for applicants to subscribe to the Pinal County Dust Control forecast as part of the permit application process.

   - For clarification purposes, modified the project information sign requirements in §4-3-180.C.2.f to make the sign more descriptive as to its purpose (i.e. complaints) from the original language, "Pinal County Air Quality Control District phone number" to "Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929".

CLOSE

PINAL • COUNTY
Wide open opportunity

NOTICE OF PUBLIC MEETING AND EXECUTIVE SESSION
PINAL COUNTY BOARD OF SUPERVISORS
SUMMARY OF AGENDA FOR REGULAR SESSION
Wednesday, October 28, 2015

9:30 AM - CALL TO ORDER

PINAL COUNTY ADMINISTRATIVE COMPLEX
BOARD OF SUPERVISORS HEARING ROOM
135 N. PINAL STREET
FLORENCE, AZ 85132

PLEDGE OF ALLEGIANCE - INVOCATION

BUSINESS BEFORE THE BOARD

(Consideration/Approval/Disapproval of the following:)

(1) Call to Public -
Consideration and discussion of comments from the public. Those wishing to address the Pinal County Board of Supervisors need not request permission in advance. Action taken as a result of public comment will be limited to directing staff to study the matter or rescheduling the matter for further consideration and decision at a later date.

(2) Recognition of Public Works Employee, Ray Garcia, for his assistance and participation in an emergency rescue. (Louis Andersen)

(3) Presentation of Certificates of Service to employees for 20, 25 and 30 years of service. (Stephanie Maack)

(4) County Manager's Report (Information Only). (Greg Stanley)

(5) Purchasing Division Report - October 28, 2015 (Randon Riffey/Leo Lew)

(6) **CONSENT ITEMS**: All items indicated by an asterisk (*) will be handled by a single vote as part of the consent agenda, unless a Board Member, County Manager, or member of the public objects at the time the agenda item is called.

***A.** Discussion/approval/disapproval of the Minutes of October 7, 2015. (Sheri Cluff)

***B.** Discussion/approval/disapproval of the current billings before the Board. (Sheri Cluff)

***C.** Discussion/approval/disapproval to direct the Pinal County Finance Department to issue a replacement check to Emodeon Business Services in the amount of $54.75. Check No. 0293267228 dated 10/27/2011 was never cashed and is now stale dated.

***D.** Discussion/approval/disapproval of an Intergovernmental Agreement between Pinal County and the City of Eloy regarding participation in the Pinal County "Safety Roadeo". (Jack Flindt/Greg Stanley)

***E.** Discussion/approval/disapproval of a Temporary Construction Easement from RI CS1, LLC. A Delaware limited liability company, owner of parcel 210-18-004B, for Hunt Highway Widening Project Phase III, located in a portion of Section 18, T3S, R8E, Supervisory District #2, in the unincorporated area of Pinal County, Arizona, as described in the legal description attached hereto. (GA15-007) (Dale Harman/Louis Andersen)

***F.** Discussion/approval/disapproval of Resolution No. 102815-GA15-008 authorizing Pinal County to enter into a license agreement with United States of America, Department of Energy, Western Area Power Administration, for the purpose of defining responsibilities in a certain traffic signal at the intersection of Gantzel Road and Chandler Heights Road and authorizing the Pinal County Engineer to execute said license agreement. Located in Supervisory District #2, Section 20, T2 S, R 8 E in the unincorporated area of Pinal County, Arizona, as described in the attached hereto and made a part of said Resolution. (GA15-008) (Dale Harman/Louis Andersen)

***G.** Discussion/approval/disapproval of Resolution No. 102815-GA15-009 accepting an agreement to donate easement and waiver of appraisal and compensation and Deed of Easement from F&M LLC., located in a portion of Section 24, T7S, R6E, Supervisory District #4, in the unincorporated area of Pinal County, Arizona, as legally described in Exhibits A attached to said Resolution. (GA15-009) (Dale Harman/Louis Andersen)

***H.** Discussion/approval/disapproval of Resolution No. 102815-GA15-010 approving a road construction participation agreement with Psalm 91 LLC., to define responsibilities and financial commitments. (GA15-010) (Dale Harman/Louis Andersen)

***I.** Discussion/approval/disapproval of the Pinal County Board of Supervisors to accept the Homeland Security Grant Program Award in the amount of $146,250.00, managed by the

Arizona Department of Homeland Security (AZDOHS) through Public Works, for the period of 10/01/15 to 09/30/16. This does not require a FY 15/16 budget amendment as the funds were approved in the FY 15/16 budget. This has no impact on the General Fund. (GA15-011) (Charles Kmet/Louis Andersen)

*J. Discussion/approval/disapproval of Resolution No. 102815-RD15-023 accepting an easement for sidewalk purposes on parcel 210-19-057D, from Johnson Ranch Holdings, LLC, located in a portion of Section 19, T3S, R8E, along Bella Vista Blvd., Supervisory District #2, in the unincorporated area of Pinal County, Arizona, as legally described in Exhibit A attached to said Resolution. (RD15-023) (Dale Harman/Louis Andersen)

*K. Discussion/approval/disapproval of Resolution No. 102815-RD15-024 accepting a dedication of easement for a public street and roadway purposes in connection with the Pavilions at San Tan Heights, located within section 12, T3S, R7E, Supervisory District # 2, in the unincorporated area of Pinal County, Arizona. (RD15-024) (Dale Harman/Louis Andersen)

*L. Discussion/approval/disapproval of Resolution No. 102815-RD15-029 approving the purchase of a perpetual right and easement in the amount of $33,400.00 and title charges in the amount of $1,237.00 for a total of $34,637.00, from Leon M. Yoakum, for the Price Road Realignment Project located in a portion of Section 16, T4S, R10E, Supervisory District 2, in the unincorporated area of Pinal County, Arizona. (RD15-029) (Dale Harman/Louis Andersen)

*M. Discussion/approval/disapproval of Partial Release of Third Party Trust Assurance Agreement for Construction of Subdivision Improvements for Eagle Crest Ranch V, Lots 822 and 827. (RD15-031) (Tara Harman/Louis Andersen)

*N. Discussion/approval/disapproval of the appointment of the Pinal Workforce Development Board (PWDB) Nominee, Timothy Durkee, to serve from October 28, 2015 to October 27, 2019. (Adeline Allen/Leo Lew)

*O. Discussion/approval/disapproval of the Grant-in-Aid Agreement between the Tohono O'odham Nation and Pinal County, through the Pinal County Attorney's Office in the amount of $35,922 to provide funding to the Pinal County Family Advocacy Centers. The grant program is scheduled for one year from the execution of the award agreement with funding anticipated to be received by November 30, 2015. This funding consists of monies for printing costs for the Pinal County Attorney's Family Advocacy Center Parent Guide and personnel expenses including a part-time Victim Witness Advocate position. The award requires approval from the Board of Supervisors to establish a part-time Victim Witness Advocate position (Position #TBD/Grade 123) Step 1 Salary up to 21 hours per week ($25,922 including ERE). This requires a FY 15/16 budget amendment, moving revenues and expenditures from Fund 213 to provide budget capacity. There is no impact to the General Fund. (Lando Voyles)

*P. Discussion/approval/disapproval of Resolution No. 102815-MSIDD cancelling the November 10, 2015 election to fill three open board positions for the Maricopa-Stanfield Irrigation & Drainage District. Three candidates submitted nomination paperwork and the District asks the Board to appoint these three candidates to fill the open board positions. (Michele Forney)

*Q. Discussion/approval/disapproval of Resolution No. 102815-CAIDD cancelling the November 10, 2015 election to fill three open board positions for the Central Arizona Irrigation & Drainage District. Three candidates submitted nomination paperwork and the District asks the Board to appoint these three candidates to fill the open board positions. (Michele Forney)

*R. Discussion/approval/disapproval of Precinct Committeemen Appointments: Democratic: PCT 33, Lisa Fitzgibbons, 127 E. Laurel Circle, Casa Grande, AZ 85122; PCT 60, Audra Lee Antone, 10140 Mawid Sacaton, Sacaton, AZ 85147; PCT 14, Mary L. Duarte, 411 E. 3rd Street, Eloy, AZ 85131. (Michele Forney)

(7) Meeting of the Pinal County Flood Control District Board of Directors. (Elise Moore/Louis Andersen)

(8) Meeting of the Pinal County Library District Board of Directors. (Denise Keller)

(9) **9:30 a.m.** The following cases will be heard without additional input from the applicant or public unless prior to the time the case is publically heard, the applicant, a staff member or a member of the public requests that a case be considered

separately. In the event that no such request for a hearing is made, the Board shall vote to approve the recommendation of the Commission.

A. SUP-003-15: Sidewinder Dairy, Inc., landowner/applicant, Rose Law Group, agent, requesting approval of a Special Use Permit to plan and develop a medical marijuana off-site cultivation location on a 50.0± acre parcel in the General Rural (GR) zone; situated in a portion of the SW¼ of Section 24, T06S, R07E G&SRB&M, tax parcels 401-12-002G (legal on file) (located on the north side of Highway 287, ½ mile west of Eleven Mile Corner Rd.) Planning Commission voted 7-2 to recommend approval of SUP-003-15 with 2 stipulations. (Ashlee MacDonald/Himanshu Patel)

B. SUP-009-15: Rube and Carolyn Woolsey landowners, Sun State Towers, applicant, Pinnacle Consulting, Inc, agent, requesting approval of a Special Use Permit to construct and operate a 120' wireless communication facility on a 50' x 50' lease area of a 7.0± acre parcel in the General Rural (GR) zone; situated in a portion of the NE¼ of Section 35, T05S, R06E G&SRB&M, tax parcels 515-35-023 (legal on file) (located off of Henness Rd, east of I-10 in the Casa Grande area.) Planning Commission voted 5-4 to recommend denial of SUP-009-15. (Ashlee MacDonald/Himanshu Patel)

(10) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-RD15-025, on the extinguishment of a portion of that easement for a public highway (also known as North Pamela Drive), as recorded in Docket 366, Page 48, Records of Pinal County, Arizona, being the West 50.00 of GLO Lot 1, within Supervisor District 2, Section 12, Township 3 South, Range 7 East, in the unincorporated area of Pinal County, Arizona. (RD15-025) (Stephanie Sullivan/Louis Andersen)

(11) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-RD15-026 , on the extinguishment of a portion of that easement for a public highway (also known as West Skyline Drive), as recorded in Docket 66, Page 126, Records of Pinal County, Arizona, lying within the North 40.00 feet Section 12, Township 3 South, Range 7 East, within Supervisor District 2, in the unincorporated area of Pinal County, Arizona. (RD15-026) . (Stephanie Sullivan/Louis Andersen)

(12) Discuss/Reject or set a date for a Public Hearing for the Board Initiative on the Abandonment of a portion of Cameron Street, 20 feet wide, commencing at Arizola Road and proceeding easterly for 867.43 feet to the point of termination, located within Supervisory District #3, Section 34, T6S, R6E, within the unincorporated area of Pinal County, Arizona; to direct the County Engineer to cause a survey to be made or use available data and maps, if any, and file a report together with a survey map on the proposed abandonment/extinguishment from the County Engineer. (RD15-027) (Stephanie Sullivan/Louis Andersen)

(13) Discuss/Reject or set a date for a Public Hearing to consider the County Engineer's recommendation to establish a part of Davis Ranch Road, (as a county highway) 40 feet wide, commencing at Cattletank Road and proceeding east for approximately one (1) mile terminating at Jacy Trail, located in Section 29, Township 10 South, Range 11 East, within the unincorporated area of Pinal County, and lying within Supervisory District #4. (RD15-028) (Stephanie Sullivan/Scott Bender/Louis Andersen)

(14) Discuss/Reject or set a date for a Public Hearing for the Board Initiative on the Abandonment of a portion of Sundrift Drive, 80 feet wide, commencing at Treasure Road and proceeding southeasterly for 2,444.42 feet to the point of termination, located within Supervisory District #4, Section(s) 8 & 9, T10S, R10E, within the unincorporated area of Pinal County, Arizona; to direct the County Engineer to cause a survey to be made or use available data and maps, if any, and file a report together with a survey map on the proposed abandonment/extinguishment from the County Engineer. (RD15-030) (Stephanie Sullivan/Louis Andersen)

(15) Public Hearing and discussion/approval/disapproval on the following requested major amendments to the 2009 Pinal County Comprehensive Plan. Although this is one public hearing covering all the following requests, the Supervisors may ask the public to speak on each major amendment request separately and may discuss and vote on each request separately.

A. PZ-PA-001-15: A request by the Community Development Department for a major amendment of the Pinal County Comprehensive Plan to amend the text of Chapter 8: Healthy Happy Residents; to add a subsection titled Healthy Places that will include new Goals, Objectives and Policies that will address the availability of healthy food, and community supported agriculture. The Planning Commission voted 5-4 to

recommend denial of PZ-PA-001-15 with no stipulations. (Ashlee MacDonald/Himanshu Patel)

B. PZ-PA-002-15: : A request by the Community Development Department for a major amendment of the Pinal County Comprehensive Plan to amend the text Chapter 3: Sense of Community to add Green Energy Production as a new land use designation under "Additional Land Use Designations"; and amend the text of Chapter 10: Implementation to allow requests to the "Green Energy Production" designation as non-major amendments up to 640 acres. The Planning Commission voted unanimously (9-0) to recommend approval of PZ-PA-002-15 with no stipulations. (Steve Abraham/Himanshu Patel)

C. PZ-PA-004-15: A request by San Tan 320, LLC. to amend the 2009 Pinal County Comprehensive Plan by changing the land use designation from Very Low Density Residential (0-1 du/ac) to Low Density Residential (0-2 du/ac) on approximately 320.73± acres, situated in a portion of Sections 15 and 22, T03S, R07E located adjacent to the south side of Phillips Road approximately .5 miles west of Thompson Road. The Planning Commission voted unanimously (9-0) to recommend approval of PZ-PA-004-15 with no stipulations. (Evan Balmer/Himanshu Patel) (Dedrick Denton/Himanshu Patel)

(16) Public Hearing and discussion/approval/disapproval of the petition to organize the Red Rock Irrigation and Drainage District per A.R.S. 48-2907 and for additional action on the petition as per A.R.S. 48-2905(B) (continued from October 7, 2015). (Pamela Villarreal/Kevin Costello)

(17) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ1, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from construction activity. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes. (Mike Sundblom/Greg Stanley)

(18) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ2, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from unpaved lots, open area/vacant lots, and paved and unpaved roads. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes. (Mike Sundblom/Greg Stanley)

(19) Executive session pursuant to ARS 38-431.03(A)(3) for legal advice concerning SunZia transmission line proposal and position of parties. (Greg Stanley/Chris Keller)

ADJOURNMENT

(SUPPORTING DOCUMENTS ARE AVAILABLE AT THE BOARD OF SUPERVISORS' OFFICE)

The Board may go into executive session for purposes of obtaining legal advice from the County's Attorney(s) on any of the above agenda items pursuant to A.R.S. 38-431.03(A)(3).

Public Hearing

Construction Dust Rule

Rulemaking Timeline and Status

- Held formative stakeholder meetings
- Proposed rule published in Az. Admin. Register 8/28/2015
- Held general stakeholder meeting 9/1/2015
- Held oral proceeding 9/28/2015
- 30 day public comment period closed 9/28/2015
- Board Work Session 10/21/2015

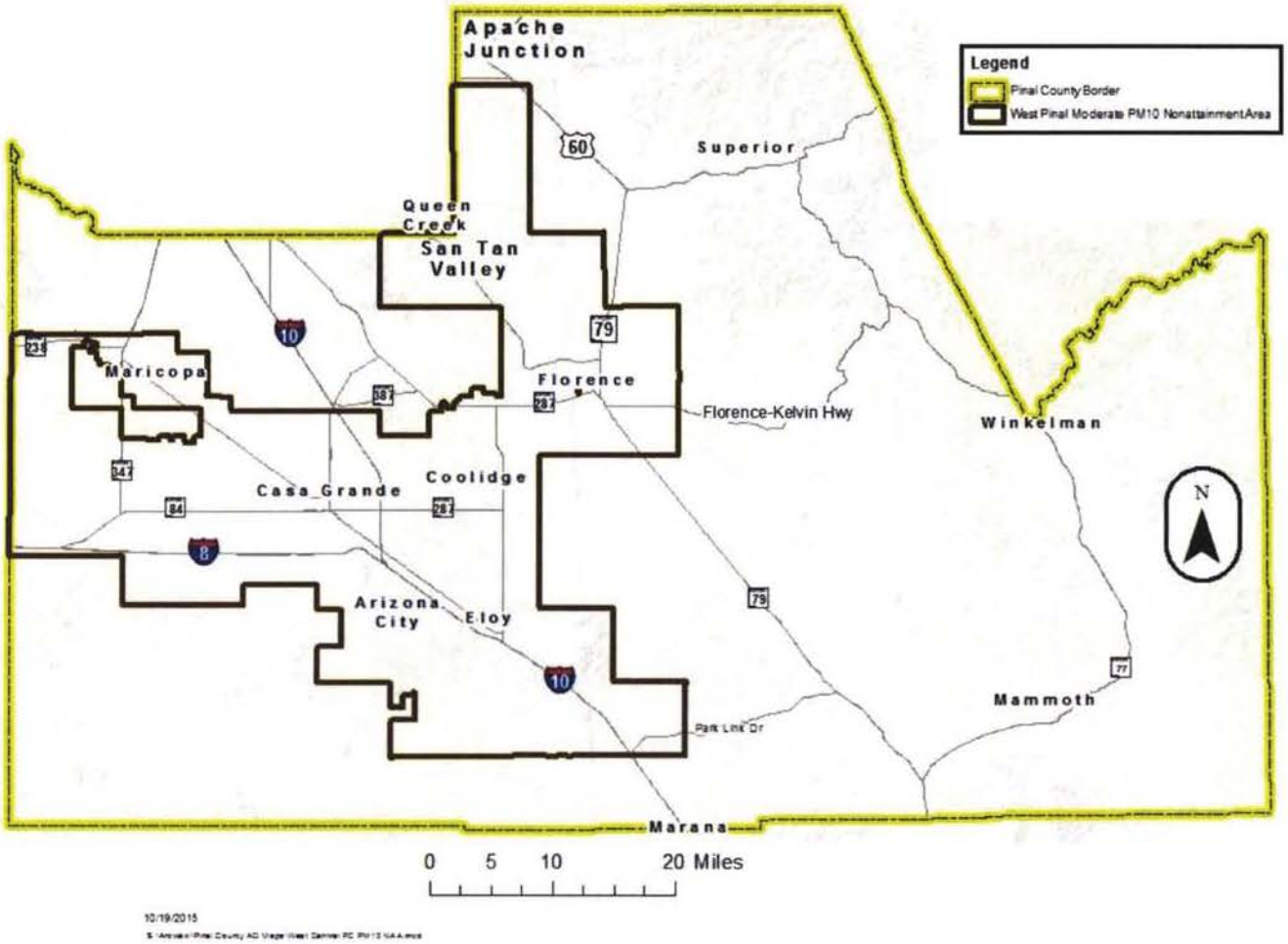
West Pinal Construction Dust Rule Highlights

- Opacity limit of 20% on the property
- Requires Stabilization of disturbed surfaces
- Permit application identifies specific control measures used on-site
- Permit holder must conduct self inspections and submit report
- Site 5 acres or greater:
  - Install a project information sign
  - Install trackout control
  - Inactive sites must erect signs or install barriers to limit trespass
  - Stabilized site the day before and day of forecasted high risk

Resolution

- The resolution adopts the Construction rule
- Directs Air Quality to request that ADEQ submit the rules to EPA for inclusion in the Sate Implementation Plan

West Pinal PM_{10} Nonattainment Area



10/19/2015

Regular Session October 28, 2015

A video recording of this meeting and presentations can be viewed at www.pinalcountyaz.gov

The Pinal County Board of Supervisors convened at 9:32 A.M. this date in the Board of Supervisors Hearing Room, 135 N. Pinal Street, Florence, Arizona. The meeting was called to order by Chairwoman Chase followed by an Invocation by Chaplain Jack Siddle and the Pledge of Allegiance.

Present: Chairwoman Cheryl Chase; Vice-Chairman Pete Rios; Supervisor Stephen Q. Miller; Supervisor Anthony Smith; Supervisor Todd House; County Manager, Greg Stanley; Chief Civil Deputy County Attorney, Chris Keller; and Assistant to the Clerk of the Board, Diane Gardner.

Call to Public –

Barry McCain, Arizona City, discussed the importance of the Constitution and due process.

Neil Macdonald, SaddleBrooke, appeared before the Board and advised that he is the Vice President of Communications for SaddleBrooke. He stated that they have almost 800 members in the group and from time to time they will come before the Board to provide honest appraisals of what they see happening and supportive of things that need to happen.

Point of Personal Privilege

Supervisor Smith took a point of personal privilege to recognize that early in the week, the City of Maricopa was awarded a $15 million Tiger Grant. This is significant to expediting a very important regional transportation item that is called the Great Separation Project. Supervisor Smith thanked the Congressional Delegation especially Congresswoman Kirkpatrick for her long diligent work in making this a reality.

Supervisor Rios also wanted to thank Congresswoman Kirkpatrick for the $15 million Tiger Grant. These grants are very rare and far apart and the improvements to State Route 347 are vitally needed.

Supervisor Rios stated that as we get into the political season, staff needs to be careful about making public political statements.

Recognition of Public Works Employee, Ray Garcia, for his assistance and participation in an emergency rescue.

Motion was made by Supervisor Rios to approve PZ-PA-002-15 as presented.

Motion was amended by Supervisor Smith and seconded by Supervisor Miller to change it to land use designation only without respect to the acreage. Motion carried by unanimous vote.

Supervisor Smith explained his amendment by stating that the land use designation only, without respect to the acreage, would allow it to be employment, public services and green energy.

Supervisor Rios moved the motion as amended and seconded by Supervisor Miller. Motion as amended carried by unanimous vote.

Motion was made by Supervisor Rios and seconded by Supervisor House to approve PZ-PA-004-15 as presented. Motion carried by unanimous vote.

The following item was removed from the agenda as the applicant formally withdrew their petition.

Public Hearing and discussion/approval/disapproval of the petition to organize the Red Rock Irrigation and Drainage District per A.R.S. 48-2907 and for additional action on the petition as per A.R.S. 48-2905(B) (continued from October 7, 2015).

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ1, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from construction activity. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes.

Mike Sundblom, Air Quality Director, appeared before the Board requesting approval of Resolution No. 102815-AQ1 regarding the adoption of proposed changes to local air quality rules. The changes involve establishing reasonable available control measures for PM10 generated from construction activity. Mr. Sundblom's presentation can be viewed on the Board of Supervisor's Website.

Chairwoman Chase opened the public hearing.

Mr. Sundblom said he had received a letter of support for the rule from Amanda McGinnis, Sr. Vice President of the Arizona General Contractors.

Spencer Kamps, Homebuilders Association of Central Arizona appeared before the Board and stated that the Homebuilders Association stands in support of the rule that the County has put forward and encouraged the Board to adopt it.

Chairwoman Chase closed the public hearing.

Motion was made by Supervisor Rios and seconded by Supervisor Miller to approve Resolution 102815-AQ1 a Resolution pursuant to Title 49 of the Arizona Revised Statutes adopting all of the proposed changes to local air quality rules. Motion carried by unanimous vote.

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ2, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from unpaved lots, open area/vacant lots, and paved and unpaved roads. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes.

Mike Sundblom, Air Quality Director, again appeared before the Board requesting approval of Resolution No. 102815-AQ2 regarding the adoption of proposed changes to local air quality rules regarding the fugitive dust rule. The changes involve establishing reasonable available control measures for PM10 generated from unpaved lots, open area/vacant lots and paved and unpaved roads. Mr. Sundblom's presentation can be viewed on the Board of Supervisor's Website.

Chairwoman Chase opened the public hearing. There was no one who wished to speak so she closed the public hearing.

Motion was made by Supervisor Rios and seconded by Supervisor Miller to approve Resolution 102815-AQ2 a Resolution pursuant to Title 49 of the Arizona Revised

PINAL • COUNTY
Wide open opportunity

AGENDA ITEM

October 28, 2015
ADMINISTRATION BUILDING A
FLORENCE, ARIZONA

APPROVED this 28th day of Oct 2015
Cheryl Chase
Chairman, Pinal County Board of Supervisors
ATTEST Diane Gardner
CLERK

REQUESTED BY: Mike Sundblom/Greg Stanley

Funds #: 86

Dept. #: 314018

Dept. Name: Air Quality

Director: Mike Sundblom

BRIEF DESCRIPTION OF AGENDA ITEM AND REQUESTED BOARD ACTION:

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ1, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from construction activity. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes.

BRIEF DESCRIPTION OF THE FISCAL CONSIDERATIONS AND/OR EXPECTED FISCAL IMPACT OF THIS AGENDA ITEM:

BRIEF DESCRIPTION OF THE EXPECTED PERFORMANCE IMPACT OF THIS AGENDA ITEM:

MOTION:

Approve as presented.

History

Time	Who	Approval
10/15/2015 3:13 PM	County Attorney	Yes
10/15/2015 3:15 PM	Air Quality	Yes
10/16/2015 9:14 AM	County Manager	Yes
10/22/2015 10:54 AM	Clerk of the Board	Yes

ATTACHMENTS:

Click to download

- Resolution
- Concise Explanatory Statement

When recorded return to:
Clerk of the Board
Pinal County
P.O. Box 827
Florence, Arizona 85232

PINAL COUNTY BOARD OF SUPERVISORS
RESOLUTION NO. 102815-AQ1
PINAL COUNTY AIR QUALITY CONTROL DISTRICT

A RESOLUTION OF THE BOARD OF SUPERVISORS OF PINAL COUNTY, ADOPTING CERTAIN REVISIONS TO THE PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AND REQUESTING THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY SUBMIT THE REVISIONS TO THE ENVIRONMENTAL PROTECTION AGENCY AS AN ELEMENT OF THE ARIZONA STATE IMPLEMENTATION PLAN.

WHEREAS, the Pinal County Board of Supervisors ("Board") is empowered under A.R.S. §49-479 to adopt rules for the purpose of controlling the release of air contaminants within the County;

WHEREAS, ongoing PM_{10} exceedances in Pinal County resulted in a July 2, 2012 Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal Moderate PM_{10} Nonattainment Area – defined in 40 CFR 81.303).;

WHEREAS, the base year (2008) PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area quantified construction emissions as a significant source category;

WHEREAS, Clean Air Act requirements (§172(c)) include developing control measures that reduce emissions from significant source categories;

WHEREAS, Pinal County in coordination with stakeholders, EPA and Arizona Department of Environmental Quality (ADEQ) developed a West Pinal PM_{10} Nonattainment area construction fugitive dust rule that provides the necessary control measures to reduce PM_{10} emissions attributed to construction activities;

WHEREAS, to the extent applicable, the District has complied with the notice-publication and other public notification requirements of A.R.S. §§49-471.04 and 49-479, and 40 C.F.R. §51-102, including a combined notice of proposed rulemaking and oral proceeding published at 21 A.A.R. 1716 (8/28/15);

WHEREAS, the Board's preference regarding inclusion of those revised rules as elements of the Arizona State Implementation Plan, are also set forth below in the proposed revision to §1-1-105;

WHEREAS, the elements of the final proposed changes in the County's air quality rules are set forth below in full;

THEREFORE, FOR THE PURPOSE OF PROTECTING AND PRESERVING THE QUALITY OF AIR WITHIN THE COUNTY IN A SENSIBLE AND ORDERLY MANNER, IT IS HEREBY RESOLVED BY THE BOARD TO:

1. **Adopt the following revisions, additions and deletions to the Pinal County Air Quality Control District Code of Regulations, the full text of which follows the indicated field markers.**
2. **Direct Pinal County Air Quality to submit the adopted rules (excluding §1-1-105) to the Arizona Department of Environmental Quality (ADEQ) with the request that they be submitted to the Environmental Protection Agency (EPA) for inclusion in the Arizona State Implementation Plan (SIP).**

***

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).

h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)
      ii. §4-3-170 (As amended 10/28/15)
      iii. §4-3-180 (As amended 10/28/15)
      iv. §4-3-190 (As amended 10/28/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";

6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

This definition excludes those permanently stabilized areas that have:

a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
b. Been paved or otherwise covered by a permanent structure; or
c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

a) Earthmoving activities
b) Land clean-up, leveling, back filling
c) Drilling
d) Construction
e) Demolition
f) Bulk material handling, storage and/or transporting operations
g) Operation of motorized machinery used in Construction
h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.

9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.

11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of

soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.

21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.
23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.
28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.
    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:
        i. Trenches less than four feet in depth, that exceed a length of 726 feet;
        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:
    1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the

work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:

1. Install suitable trackout control prior to the start of dust generating operations;
2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:

   a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or

   b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
   a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
   b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for dust generating operations associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.

v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.

vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:

a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the-completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.

f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:

   i. Project Name

   ii. Name and phone number of person(s) responsible for conducting project

   iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:

   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

IN WITNESS WHEREOF, the undersigned, in accord with the vote of the Pinal County Board of Supervisors as duly reflected in the minutes of the Board meeting, have executed this document on behalf of the Board of Supervisors on this 28th day of Oct, 2015.

PINAL COUNTY, a political subdivision of the State of Arizona,

By: Cheryl Chase
Chairwoman of the Board of Supervisors

ATTEST: Deane Gardner
assistant Clerk of the Board of Supervisors

APPROVED AS TO FORM:

Lando Voyles
Pinal County Attorney

By: Kim S. Ott
Deputy County Attorney

SECRETARY OF STATE

2015 OCT 30 AM 10: 34

FILED

AGENCY RECEIPT

NOTICE OF FINAL RULEMAKING

This receipt accompanies hard-copies and disk publication submittals entitled:

a. Agency name: Pinal County Air Quality Control District
P.O. Box 987
Florence, Arizona 85132
(520)866-6929
(520)866-6967 FAX

b. "NOTICE OF FINAL RULEMAKING" which is intended for publication on November 20, 2015.

The adopted revisions to local air quality rules involved the following:

§1-1-105 SIP List ..... Amend
§4-3-160 General Provisions – West Pinal PM10 Nonattainment Area ..... New
§4-3-170 Definitions ..... New
§4-3-180 Dust Generating Operations – Standards, Application, Permit and Recordkeeping Requirements ..... New
§4-3-190 Violations ..... New

SECRETARY OF STATE

2015 OCT 30 AM 10: 34

FILED

Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

Intended for Publication on November 20, 2015

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING
PURSUANT TO A.R.S. §49-471.01 *et seq.*

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The adopted construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity, ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the adopted rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections 160, 170, 180, 190) through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.
        b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
        c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where

dust is required to test and validate the design integrity, product quality, etc.

d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).

e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.

f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.

g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.

3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.
4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A - For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B – For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
     3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
        a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
        b) All dust generating operations are ceased and disturbed surface areas are stabilized.
   - Subsection C – Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.
     1. Application form requirements.
        a) Applicant must provide essential identification on an application form approved by the control officer.

Separate application forms required for non-contiguous areas, unless it's an annual block permit.

b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.

c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.

d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.

e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).

   a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application for more than one job site, though each work site has to be described in the application along with what type of dust generating operations are to be conducted.

   b. Area block applications are only available to

      i. Political subdivisions and

      ii. Public utility corporations regulated by the Arizona Corporation Commission and

      iii. Contractors or subcontractors for political subdivisions or public utility corporations

   c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.

   d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and type of dust generating operation, control measures used and start date.

2. Permit and recordkeeping requirements.

   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work

site at all times dust generating operations are taking place. The permit is to reside on the work site.

b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.

c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.

d) Completion of project notification to Control Officer – no later than 30 days after completion.

e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.

f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)
   - Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.
   - Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:
     1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:
        a) All dust generating operations are ceased until the opacity violations are no longer taking place, or
        b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.
     2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or

justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

There are estimated small incremental costs to the businesses potentially affected by the adopted construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these adopted rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time.

The stabilization requirements of the adopted rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule adoption for water use wouldn't be additionally burdensome.

Pinal County

Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1715, August 28, 2015.

Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1716, August 28, 2015

2. The full text of the adopted changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045

iii. §3-1-080
iv. §3-1-100

b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
c. Article 3. (As amended 10/12/95, 5/27/15).
d. Article 8. (As amended 10/12/95 and 10/27/04).

4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)
      ii. §4-3-170 (As amended 10/28/15)
      iii. §4-3-180 (As amended 10/28/15)
      iv. §4-3-190 (As amended 10/28/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of

the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections(A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for

non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.

This definition excludes those permanently stabilized areas that have:

a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
b. Been paved or otherwise covered by a permanent structure; or
c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.

6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:

a) Earthmoving activities
b) Land clean-up, leveling, back filling
c) Drilling
d) Construction
e) Demolition
f) Bulk material handling, storage and/or transporting operations
g) Operation of motorized machinery used in Construction
h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
i) Installing initial landscapes using mechanized equipment

For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.

7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.

8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.

9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.

11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.
15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.
21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.

23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.
28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.
    a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:
        i. Trenches less than four feet in depth, that exceed a length of 726 feet;
        ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;
    b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.
    c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:
    1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
    2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:
    1. Install suitable trackout control prior to the start of dust generating operations;

2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:

   a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or

   b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.

1. Dust generating operations application form:
   a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
   b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
   c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
   d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
   e. Annual Area Block Application:
      i. Area block applications shall only be available for dust generating operations associated with:
         a) Maintenance of existing underground or above-ground lines;
         b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
         c) Underground utility line extensions not exceeding 500' in length; and
         d) Overhead utility line extensions; and
         e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.
      ii. Area block applications shall only be available to:

a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.

v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.

vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:

a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the-completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one

year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.

f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:
   i. Project Name
   ii. Name and phone number of person(s) responsible for conducting project
   iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:
   a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or
   b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.
2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.

B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:

i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.

ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING

PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-290]

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The adopted construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity,

ground stabilization, etc.) that limit PM_{10} emissions attributed to construction activities under both stagnation and windy conditions. In addition, the adopted rules are designed to provide application, permitting and recordkeeping requirements that ensure verification of the control measures used to control emissions associated with the construction activities.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 3 (specifically sections 160, 170, 180, 190) through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-3-160. General Provisions – West Pinal PM10 Nonattainment Area	New
§4-3-170. Definitions	New
§4-3-180. Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements	New
§4-3-190. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 3, sections 160, 170, 180 and 190 and their adoption dates in Section 1-1-105 which is a list designating which Board approved rules (and their corresponding adoption dates) that are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Addition of Chapter 4, Article 3, §160 (General Provisions),
   - Subsection A – Intent and Applicability
     1. The intention of the rules – To control emissions associated with construction activities (process, site, surface stabilization)
     2. Rules effective date – January 1, 2016
     3. Geographic scope – West Pinal County PM_{10} Moderate Nonattainment area
   - Subsection B – General Prohibition and Exemptions
     1. It is a violation for anyone conducting dust generating operations at any work site without complying with this article.
     2. Exemptions
        a) Application and permit requirements for facilities operating under an industrial permit.
        b) In the case of an emergency, stabilization actions can be taken before submitting a dust generating operation application.
        c) Applicable standards, application and permit requirements are exempt at legitimate vehicle test and development facilities for specific dust activities where dust is required to test and validate the design integrity, product quality, etc.

d) Road maintenance activities are exempt from application and permit requirements. However those related dust generating operations are subject to the applicable standards (i.e. opacity, stabilization, trackout, etc.).
e) Dust generating operations associated with emergency repair of utilities don't require an application or permit.
f) Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
g) Rooftop operations for cutting, drilling, grinding or coring roofing tile when activity is occurring on a pitched roof.

3. Addition of Chapter 4, Article 3, §170 (Definitions),
   - Twenty eight definitions directly related to these rules including eight control measures and their descriptions.
4. Addition of Chapter 4, Article 3, §180 (Dust Generating Operations Standards, Application, Permit and Recordkeeping Requirements)
   - Subsection A – For all work sites where construction is taking place on areas 0.1 acres or larger, an owner and/or operator shall comply with,
     1. 20% opacity standard for any dust generating operations that occur during construction.
     2. Stabilization requirement. Every other week inspections to ensure work site is stabilized with all applicable control measures as specified in the permit.
   - Subsection B – For work sites (or a combination of work sites) 5 acres or larger, an owner and/or operator shall:
     1. Install a suitable trackout control device prior to starting dust generating operations
     2. For areas where dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
     3. Ensure the work site is stabilized the day leading up to and the day that's forecast to be high risk for dust emissions in the Pinal County Dust Risk Forecast. To ensure the work site is stabilized, a site-wide inspection is needed to ensure either:
        a) All applicable control measures are implemented on dust generating operations and disturbed surface areas are stabilized, or
        b) All dust generating operations are ceased and disturbed surface areas are stabilized.
   - Subsection C – Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application, pay the appropriate fee and receive a signed permit from the Control Officer.
     1. Application form requirements.
        a) Applicant must provide essential identification on an application form approved by the control officer. Separate application forms required for non-contiguous areas, unless it's an annual block permit.
        b) A valid cell phone number or email address is required on the application form. The applicant shall subscribe to the Pinal County Dust Control Forecast.
        c) A plot plan is required for each application and shall identify (if available) the parcel(s), street address, direction north, total area to be disturbed and sources of fugitive dust emissions.
        d) Using options on the application, the applicant shall explain how they will demonstrate compliance with the rule by selecting at least one control measure for each dust generating operation.
        e) Annual area block application – available to only certain dust generating operations (i.e. Utilities - maintenance of existing underground or above-ground lines, expansion or extension of paved roads, unpaved roads, etc.).
           a. Application requirements – The same as other dust generation operations, except block permits are allowed to have one application

for more than one job site, though each work site has to be described in the application along with what type of dust generating operations are to be conducted.

b. Area block applications are only available to
   i. Political subdivisions and
   ii. Public utility corporations regulated by the Arizona Corporation Commission and
   iii. Contractors or subcontractors for political subdivisions or public utility corporations

c. The owner and/or operator of area block permits are required to adhere to the requirements of all current permits issued to the work site and required to re-apply control measures as necessary or re-stabilize any disturbed surface area.

d. For any project not listed on the application, the applicant must notify the control officer in writing at least three working days prior to commencing the dust generating operation with information including site locations, size and type of dust generating operation, control measures used and start date.

2. Permit and recordkeeping requirements.
   a) A signed permit shall constitute agreement by the owner and/or operator to accept responsibility for meeting conditions of the permit and ensuring the applicable control measures are implemented throughout the work site at all times dust generating operations are taking place. The permit is to reside on the work site.
   b) On a form approved by the control officer, the owner and/or operator shall keep records of the every other week inspections and site-wide inspection reports for the day leading up to and including the day forecast to be high risk.
   c) Verbal or written requests by the Control Officer for inspection records shall be provided as soon as practicable, but not later than 72 hours. If the Control Officer is on site where the records reside, they shall be provided without delay. On a form approved by the control officer, records shall be submitted within 30 days following the termination or expiration of the dust generating permit.
   d) Completion of project notification to Control Officer – no later than 30 days after completion.
   e) Permit renewal requirements – Original permit valid for one year. If project not finished within a year, applicant shall reapply prior to the expiration of the original permit. The next permit will be valid starting on the first calendar day after completion of the initial one year period of the original permit and is valid for one year from that date. The renewal doesn't need to have contiguous acreage, as long as all of the acreage was included in the original permit.
   f) Work Sites five acres or larger – project information sign requirements.

5. Addition of Chapter 4, Article 3, §190 (Violations)
   - Subsection A – Failure to comply with applicable requirements of this article shall constitute a violation.
   - Subsection B – Violation Exemptions – If records are kept in accordance with the requirements of this article, the opacity provisions shall not apply to a work site during:
     1. Wind conditions as long as all control measures specified in the permit are implemented, applied and maintained and all disturbed surface areas are stabilized and one of the following:

a) All dust generating operations are ceased until the opacity violations are no longer taking place, or
b) Documentation is maintained showing any dust generating operations still being performed are not the cause of and do not contribute to the opacity violation.

2. Emergency maintenance of flood control channels and water retention basins if all control measures in the permit are implemented, applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:
Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement
There are estimated small incremental costs to the businesses potentially affected by the adopted construction fugitive dust rules. The new opacity requirements may require the regulated community to complete opacity certification in order to comply with §§4-3-180.A.1.

In conservative estimates, there will be small incremental costs associated with keeping the appropriate records that are required under these adopted rules. The amount of time it will take the regulated community to conduct inspections of their respective work sites every other week (for work sites 0.1 acres and larger) and on the day leading up to and including the day of high risk forecasts (for work sites 5 acres and larger) in order to determine if all applicable control measures are implemented and all disturbed surface areas are stabilized will add to overall labor costs associated with each respective construction project. However the extent as to their specific budgetary impacts is unknown at this time.

The stabilization requirements of the adopted rules may also add costs to the regulated community. However the current construction fugitive dust rule (Chapter 4, Article 3) in effect in the West Pinal PM_{10} Nonattainment area includes the same opacity requirements along with similar application and permitting requirements. Therefore current business practices for construction activities in Pinal County necessitate the use of water on all construction sites 0.1 acres and larger. Therefore it's estimated that the added costs to the regulated community potentially affected by this rule adoption for water use wouldn't be additionally burdensome.

Pinal County
Estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect on January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).
Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:
Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ

either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:
Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132
http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1715, August 28, 2015.
Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1716, August 28, 2015

2. The full text of the adopted changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1. (As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2. (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. ~~Reserved.~~ Article 3, limited to:
      i. §4-3-160 (As amended 10/28/15)
      ii. §4-3-170 (As amended 10/28/15)
      iii. §4-3-180 (As amended 10/28/15)
      iv. §4-3-190 (As amended 10/28/15)
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.

g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
i. §4-9-320 (As amended 6/3/09)
ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
a. §111 of the Clean Air Act; or
b. Title IV of the 1990 amendments to the Clean Air Act; or
c. Title VI of the 1990 amendments to the Clean Air Act; or
d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*

20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 3. CONSTRUCTION SITES - FUGITIVE DUST

4-3-160. General Provisions – West Pinal PM10 Nonattainment Area

A. Intent and Applicability

1. Intent

The intent of this Article is to control dust emissions associated with construction activities. This Article focuses on fugitive dust emissions from process activity, site activity and a lack of adequate surface stabilization, all associated with construction.

2. Effective Date

The rules in this Article will become effective on January 1, 2016.

3. Geographic Scope

The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303. These rules exclude the rest of Pinal County and the Pinal County portion of the Phoenix PM10 Serious Nonattainment area, more specifically Township 1 North, Range 8 East, Gila & Salt River Base and Meridian ("T1N R8E") which is covered under Chapter 4, Article 7.

B. General Prohibition and Exemptions

1. Subject to the exemptions set forth in this Article, it constitutes a violation of this Article for any person to conduct any dust generating operation at any work site, without complying with this Article:

2. Exemptions

The following are exempt from this Article, or portions of this Article:

a. The application and permit requirements of this Article shall not apply to any facility operating under authority of a permit issued pursuant to ARS §§49-426 or 49-480, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and facilities must keep records pursuant to §4-3-180(C)(2)(b).

b. In the case of an emergency, action may be taken to stabilize a dust generating operation or disturbed surface area before submitting a dust generating operation application form. Upon stabilizing the emergency situation, a dust generating operation application form shall be submitted.

c. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the application, permit and applicable standards in section §4-3-180 under this Article.

d. The application and permit requirements of this rule shall not apply to road maintenance activities, however, any dust generating operations are subject to the requirements of §4-3-180 sections (A) and (B), and records must be kept pursuant to §4-3-180(C)(2)(b).

e. The application and permit requirements shall not apply with respect to dust generating operations associated with the emergency repair of utilities.

f. Establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports are exempt from the application, permit, and standards in section §4-3-180 of this Article. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching performed to establish initial landscapes or to redesign existing landscapes.

g. The provisions of this rule shall not apply to rooftop operations for cutting, drilling, grinding, or coring roofing tile when such activity is occurring on a pitched roof.

4-3-170. Definitions

See Chapter 1, Article 3 (General Provisions and Definitions) of this code for definitions of terms that are used but not specifically defined in this Article.

1. "BULK MATERIAL" as used in this Article, means any material including but not limited to earth, rock, silt, sediment, sand, gravel, soil, fill, aggregate less than 2 inches in length or diameter, dirt, mud, demolition debris, trash, cinders, pumice, saw dust, and dry concrete, which are capable of producing fugitive dust at an industrial, institutional, commercial, governmental, construction and/or demolition site.
2. "BULK MATERIAL HANDLING, STORAGE AND/OR TRANSPORTING OPERATION" as used in this Article, means the processing of bulk materials, including but not limited to, the loading, unloading, conveying, transporting, piling, stacking, screening, grading, or moving of bulk materials.
3. CONSTRUCTION as used in this Article means building, maintaining or modifying a capital improvement resting upon, connected to or buried in the earth. Construction includes, but is not limited to, vertical construction, residential construction, installing underground utilities, installing above-ground utilities, and building physical infrastructure including roads, highways, railways, flood structures, drainage works and irrigation works. Notwithstanding any other exemption under these rules, weed abatement by discing or blading and conducted for the purpose of enabling Development Activity or maintaining a work site shall qualify as construction.
4. "CONTROL MEASURE" as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust at a work site in order to comply with applicable standards in section §4-3-180. Control measures include but are not limited to:

CONTROL MEASURES	Description
Watering (pre-wetting)	Application of water by means of trucks, hoses, and/or sprinklers prior to conducting any dust generating operation. This will increase the moisture content of the soils and increase stability of the soil.
Watering (operational control)	For disturbed surface areas and dust generating operations water is applied at sufficient intervals and quantity to increase the moisture content of the soils and increase stability of the soil. Also during stacking, loading and unloading operations on open storage piles, apply water as necessary.
Applying chemical stabilizers or dust suppressants	Apply chemical stabilizers/dust suppressants to disturbed surface areas and dust generating operations. Effective in areas which are not subject to daily disturbances.
Altering load-in/load-out procedures and watering	Confine load-in-load out procedures to downwind side of the material and mist material with water prior to loading. Empty loader slowly and keep bucket close to the truck while dumping.
Reducing vehicular speeds	Restrict maximum vehicular speeds to 15 miles per hour on unpaved easements, right of way, unpaved haul/access roads and parking lots.
Controlling Freeboard and spillage and covering haul vehicles	Load all trucks such that the freeboard is not less than three inches; and prevent spillage or loss of bulk material from holes or other openings in the conveyance; cover all haul trucks (empty or full) with an anchored tarp or other suitable anchored material.
Trackout Control	Install trackout control for work sites 5 acres or larger. For all work sites, when trackout extends a cumulative distance of 50 linear feet or more, be cleaned up as soon as practicable; but, in any case, by the end of the work day.
Limit, restrict or reroute motor vehicles access to work site	Erect signs or install physical barriers to limit access of work site.
Other measures as proposed by registrant	Specific measures that are adequate to address applicable standards in section §4-3-180 at the work site. Alternative measures must be approved by the Control Officer and the EPA Administrator.

5. "DISTURBED SURFACE AREA" as used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
   This definition excludes those permanently stabilized areas that have:
   a. Been restored to a natural condition, such that vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;
   b. Been paved or otherwise covered by a permanent structure; or
   c. Sustained a vegetative ground cover over at least 70 percent of the area for at least 30 days.
6. "DUST GENERATING OPERATION" as used in this Article, means any activity capable of generating fugitive dust, including but not limited to:
   a) Earthmoving activities
   b) Land clean-up, leveling, back filling
   c) Drilling
   d) Construction
   e) Demolition
   f) Bulk material handling, storage and/or transporting operations
   g) Operation of motorized machinery used in Construction
   h) Establishing and/or using unpaved parking lots, haul/access roads within a work site
   i) Installing initial landscapes using mechanized equipment
   For the purpose of this rule, landscape maintenance and/or playing on a ball field shall not be considered a dust generating operation.
7. "DUST SUPPRESSANT" as used in this Article, means hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
8. "EARTHMOVING ACTIVITY" as used in this Article, means any land clearing, land cutting and filling operations, blasting, trenching, road construction, grading, landscaping, landfill operations, weed abatement through discing, soil mulching, or any other activity associated with land development where the objective is to disturb the surface of the earth.
9. "EMERGENCY" as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the dust generating operation to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
10. "FREEBOARD" as used in this Article, means the vertical distance between the top edge of a cargo container and the highest point at which the bulk material contacts the sides, front, and back of the container.
11. "FUGITIVE DUST", as used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this Article, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
12. "GRAVEL PAD" as used in this Article, means a layer of washed gravel, rock, or crushed rock at the intersection with the paved public roadway and a work site entrance to dislodge mud, dirt, and/or debris from the tire of the motor vehicles or haul trucks prior to leaving the work site.
13. "GRIZZLY" as used in this Article, means a device maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt and/or debris from the tires of the motor vehicles or haul trucks prior to leaving the work site.
14. "HAUL TRUCK" as used in this Article, is any fully or partially open-bodied self-propelled vehicle including any non-motorized attachments, such as but not limited to, trailers or other conveyances, which are connected to or propelled by the actual motorized portion of the vehicle used for transporting bulk materials.

15. "MOTOR VEHICLE" as used in this Article, is a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform Motor Vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
16. "OWNER AND/OR OPERATOR" as used in this Article, is any person including, but not limited to, the property owner, lessee, developer, responsible official, dust generating operation permit applicant (who may also be the responsible party contracting to do the work), general or prime contractor, supervisor, management company, or any person who owns, leases, operates, controls, or supervises a dust generating operation subject to the requirements of this rule.
17. "PAVED PUBLIC ROADWAY" means a publicly owned paved roadway, owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    1. An on-going maintenance obligation for the roadway; or
    2. A title or easement for the roadway.
18. "PINAL COUNTY DUST CONTROL FORECAST" means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a) Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b) Existing concentrations of air pollution at the time of the forecast; and
    c) Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
19. "ROAD CONSTRUCTION" as used in this Article, means the use of any equipment for the paving or new construction of a road surface, street or highway.
20. "ROAD MAINTENANCE" as used in this Article, means the use of any equipment for the repair and preservation of an old road surface, street or highway.
21. "STABILIZE" means any previously disturbed surface area which, through application of water or dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust. Stabilization shall be demonstrated by application of the drop ball test in Article 9 (§4-9-320.B.1).
22. "TRACKOUT" means visible material deposited onto any paved public roadway, as defined in this Article, by traffic leaving a work site.
23. "TRACKOUT CONTROL" as used in this Article, means a gravel pad, grizzly, wheel wash system, or a paved area, located at the point of intersection of an unpaved area and a paved public roadway that controls or prevents vehicular trackout.
24. "TRENCH" as used in this Article, means a long, narrow excavation dug in the earth (as for drainage).
25. "UNPAVED HAUL/ACCESS ROAD" as used in this Article, means any on-site unpaved road used by commercial, industrial, institutional, and/or governmental traffic.
26. "UNPAVED PARKING LOT" as used in this Article, means any area larger than 5,000 square feet that is not paved and that is used for parking, maneuvering, or storing motor vehicles on a work site.
27. "UNPAVED ROAD" as used in this Article, means any unsealed or unpaved roads, equipment path, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. For the purpose of this rule, an unpaved road is not a horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.
28. "WORK SITE" as used in this Article, means any property upon which dust generating operations occur during construction, and which covers an area of 0.1 acres or larger.

a. Trenches that are equal to or larger than the following dimensions are considered work sites and are subject to the requirement of this Article:
   i. Trenches less than four feet in depth, that exceed a length of 726 feet;
   ii. Trenches that are four feet or greater in depth, that exceed a length of 363 feet;
b. For calculations of disturbed surface areas for land clearing or earthmoving activities, 25 feet will be added to each dimension of all structures, driveways, concrete pads, and other construction projects being built on the site to allow for an equipment utilization zone. If this final figure equals or exceeds 0.1 acres, a dust generating operation application is required for the site.
c. If the registrant identifies situations in which the amount of surface area for trenches, land clearing or earthmoving activities should be calculated differently, a case-by-case determination may be made.

4-3-180. DUST GENERATING OPERATIONS Standards, Application, Permit and Recordkeeping Requirements

A. Within the work site, an owner and/or operator:
   1. Shall not conduct or allow dust generating operations that result in opacity of the dust on the property to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved by the Control Officer and the EPA Administrator.
   2. Shall stabilize any disturbed surface area. The owner and/or operator shall conduct every other week inspections to ensure that the work site is stabilized. Ensuring the work site is stabilized shall include a site-wide inspection to ensure all applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations and disturbed surface areas are stabilized.

B. Where an owner and/or operator obtains a dust generating operation permit for a work site, or a combination of work sites, which are 5 acres or larger, the owner and/or operator shall as soon as practicable:
   1. Install suitable trackout control prior to the start of dust generating operations;
   2. For areas, or portions of areas, in which the dust generating operations have ceased or will cease for more than 30 days, erect signs or install physical barriers to limit trespass; and
   3. Ensure the work site is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County Dust Control Forecast. Ensuring the work site is stabilized shall include a site-wide inspection to ensure either:
      a. All applicable control measures [as described in §4-3-170.4] as specified in the permit, are implemented on dust generating operations, and disturbed surface areas are stabilized; or
      b. All dust generating operations are ceased and disturbed surface areas are stabilized.

C. Prior to engaging in any dust generating operations on a work site, the owner and/or operator shall file a dust generating operation application form with the Control Officer, pay the appropriate fee in Appendix C, and receive a signed permit from the Control Officer.
   1. Dust generating operations application form:
      a. The applicant shall present a dust generating operation application on a form approved by the Control Officer, and shall include all essential identification information as specified on that form. A separate application form is required for each site location that is not a contiguous geographic area to the location on the original application form, unless an annual block application is approved.
      b. The owner and/or operator shall provide a valid cell phone number or email address on the dust generating operation application form. The owner and/or operator of work sites 5 acres or larger shall subscribe to the Pinal County Dust Control Forecast as part of the permit application process.
      c. Each dust generating operation application shall also include a plot plan with linear dimensions in feet. The plot plan must be on 8-1/2 by 11 inch paper, and may be on one or more sheets. The plan shall identify the parcel (if a parcel number exists; if no parcel number exists, then Global Positioning System (GPS) coordinates of the center of the parcel shall be included), the street address, the direction north, the total area to be disturbed and indicate the sources of fugitive dust emissions on the plot plan.
      d. Using the options on the application form each dust generating operation application shall contain an explanation of how the applicant will demonstrate compliance with this rule by selection of at least one control measure for each dust generating operation.
      e. Annual Area Block Application:
         i. Area block applications shall only be available for dust generating operations associated with:

a) Maintenance of existing underground or above-ground lines;
b) Effecting end-user connections, including but not limited to water connections, sewer connections, natural gas connections, electrical power connections, and communication connections;
c) Underground utility line extensions not exceeding 500' in length; and
d) Overhead utility line extensions; and
e) Expansion or extension of paved roads, unpaved roads, road shoulders, and/or alleys and public right of ways at non-contiguous sites.

ii. Area block applications shall only be available to:
a) Political subdivisions; and
b) Public Utility Corporations regulated by the Arizona Corporation Commission; and.
c) Contractors or subcontractors for Political subdivisions or Public Utility Corporations

iii. The owner and/or operator operating at the work site may submit to the Control Officer one dust generating operation application for more than one dust generating operation at which construction will commence within 12 months of permit issuance.

iv. An annual block application must include all the requirements listed above in this subsection (1 a. through 1 d.) and a description of each site and type of dust generating operations to be conducted.

v. The owner and/or operator of an area block permit operating at a work site shall adhere to the requirements of all current permits issued to the work site and will be required to re-apply control measures as reasonable and necessary, or re-stabilize any disturbed surface area that becomes disturbed as a result of the area block permit holder's work being done at the work site.

vi. For any project not listed in the dust generating operation annual block application, the applicant must notify the Control Officer in writing at least three working days prior to commencing the dust generating operation. Such notification must include the site location, size, and type of dust generating operation, selected control measures, and start date.

2. Dust generating operation permit and recordkeeping:

a. The signed dust generating operation permit from the control officer will contain the requirements set under §4-3-180 (A) and (B), and conditions regarding the necessary control measures specific to the applicable project as proposed by the registrant. The signature of the owner and/or operator on the dust generating operation permit form shall constitute agreement to accept responsibility for meeting the conditions of the permit and for ensuring the applicable control measures are implemented throughout the work site, at all times that dust generating operations are being performed and during the duration of the project. The owner and/or operator shall maintain a copy of the signed permit form and provide it upon request of the Control Officer or his designee.

b. On a form approved by the Control Officer the owner and/or operator shall keep records of the every other week inspection reports and site-wide inspection reports from the day leading up to and the day that is forecast to be high risk for dust emissions, including any necessary corrective actions. A demonstration of compliance shall include inspections of the work site conducted pursuant to, and any actions taken to comply with, §4-3-180 sections (A)(2) and (B)(3).

c. Upon verbal or written request by the Control Officer, inspection records shall be provided as soon as practicable, but no later than 72 hours, excluding weekends. If the Control Officer is at the work site where the requested records are kept, the records shall be provided without delay. Records of inspections on a form approved by the Control Officer, shall be submitted within 30 days following the termination or expiration of the permit.

d. Owners and/or Operators shall notify the Control Officer as soon as practicable, but no later than 30 days, of the completion of the project.

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the dust generating operation permit must be renewed. The owner and/or operator shall reapply for a dust generating operation permit prior to the expiration date of

the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the dust generating operation permit does not have to be contiguous, although all acreage covered by the renewed dust generating operation permit must have been included in the original dust generating operation permit.

f. At all sites that are five acres or larger, the owner and/or operator shall erect a project information sign at the main entrance that is visible to the public or at each end of the road construction project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:

i. Project Name

ii. Name and phone number of person(s) responsible for conducting project

iii. Text stating: "Dust Complaints? Call Pinal County Air Quality at 520-866-6929"

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a work site during:

1. Wind conditions that cause fugitive dust to exceed the opacity requirements of §4-3-180 (A)(1), if all control measures as specified in the permit, are implemented, applied and maintained, all disturbed surface areas are stabilized, and one of the following:

a. All dust generating operations are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any dust generating operations that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacity observations by a certified observer.

2. Emergency maintenance of flood control channels and water retention basins if all control measures, as specified in the permit are implemented, applied, and maintained.

8. Technical Materials

"SIP Submittal" Checklist Pursuant to 40 CFR Part 51, Appendix V
Re: Pinal County Rule Revisions of October 28, 2015

December 7, 2015

Note - The "Section" references in this document refer to the sections of the 3-ring binder submittal package as conveyed to the designee of the Governor of the State of Arizona, which package the District anticipates will be transferred to the EPA Administrator. This submittal reflects rule changes adopted by the Pinal County board of Supervisors on October 28, 2015.

2.1 Administrative Materials

a. Formal Letter
- See front section of SIP Binder, prior to Section 1

b. Evidence of Adoption
- Resolution No. 102815-AQ1 – See Section 7

c. Evidence of Authority
- Kevin Costello 11/24/15 letter Re: Authority to adopt Resolution No. 102815-AQ1 – See Section 2

d. Copy of the rule
1. See Section 7 which includes Resolution No. 102815-AQ1, adopting the changes embodied in the underlined/strike-through copy of the affected provisions of the Code.
2. Revisions affecting the SIP, or possibly affecting the SIP, are identified in §1-1-105.
3. See Section 3, which comprises a courtesy codification "clean copy" rules as amended, identified as "CODE OF REGULATION "CLEAN COPY" AS AMENDED OCTOBER 28, 2015"

- See Section 4, which comprises a courtesy codification "Strikeout copy" rules as amended, identified as "CODE OF REGULATION "STRIKEOUT COPY" AS AMENDED OCTOBER 28, 2015".

e. Evidence of conformity with procedure under state law, which notice and hearing requirements arise under A.R.S. §§49-112 and 49-479

- Copy of public notices
  1. See Section 5

- Certification that hearing was held
  1. Signed Resolution No. 102815-AQ1 confirming that the Pinal County Board of Supervisors held the public hearing and approved the resolution. – See Section 7
  2. Agenda and Minutes of the October 28, 2015 public hearing – See Section 7

f. Evidence of public notice in conformity with EPA procedures, which notice requirements arise under 40 CFR Subpart I

- See Section 5

g. Evidence of public hearing in conformity with EPA procedures, which hearing requirements arise under 40 CFR Subpart I

- See Section 7

h. Compilation of comments

- See Section 6

2.2 Technical Support

a. Identification of pollutants affected.

- The West Pinal PM_{10} Nonattainment area construction fugitive dust rules affect PM_{10}.

b. Identification of attainment/nonattainment area affected

- West Pinal PM_{10} Nonattainment Area.

c. Quantification of emission changes

- The "emission changes" from these SIP-affected provisions of this package equate to 4,687 tons per year emissions reduction for the attainment year (2018), table D5-6, Appendix D, Pinal County PM_{10} Nonattainment Area 2018 Attainment Demonstration and Controlled Emissions Inventory.

d. Demonstration of protection for

- NAAQS
  See 2015 West Pinal Moderate PM_{10} Nonattainment Area SIP

- PSD increments
  Not applicable

- RFP demonstrations
  Not applicable

- Visibility
  Not applicable

e. Modeling information

- Not applicable; no-redesignation is being sought

f. Showing the emission limitations are based on continuous emission reduction technology.

- Not Applicable

g. Evidence that plan limitations are enforceable as a practical matter

- Not Applicable

h. Compliance and enforcement strategies, including explanation of how compliance will be determined in practice.

- Kevin Costello 11/24/15 letter Re: Authority to adopt Resolution No. 102815-AQ1 – See Section 2

i. Special economic and technological justifications

- EPA has not defined any applicable requirements

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
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SIP ENFORCEABILITY CHECKLIST

Re: Pinal County Rule Revisions of October 28, 2015

December 7, 2015

Based on information and belief, the "SIP Enforceability Checklist" is not applicable with regard to the subject SIP submittal. This document is being presented simply to affirm that the lack of a substantive "Checklist" reflects design, rather than inadvertent omission of such a document.

The "SIP Enforceability Checklist" pertains to source-specific, or "prohibitory," rules.

Air Quality Control District
31 N. Pinal Street, Bldg F, P.O. Box 987 Florence, AZ 85132 **T** 520-866-6929 **F** 520-866-6967 www.pinalcountyaz.gov

9. Digital Copy

Appendix I

Pinal County Rulemaking Process Documentation

General Fugitive Dust Rule

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

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December 11, 2015

Mr. Jared Blumenfeld, Regional Administrator
U.S. Environmental Protection Agency, Region IX
Mail Code ORA-1
75 Hawthorn Street
San Francisco, CA 94105

c/o Misael Cabrera, Director of Arizona Department of Environmental Quality
c/o Eric Massey, Director Air Quality Division
1110 W. Washington
Phoenix, AZ 85007

Re: Submittal of Proposed Revision to the Arizona State Implementation Plan: West Pinal PM10 NAA General Fugitive Dust Rules

Dear Mr. Blumenfeld:

Pursuant to Resolution No. 102815-AQ2 as adopted by the Pinal County Board of Supervisors on October 28, 2015, 2015, I convey a requested revision to certain rules that compromise the Pinal County portion of the Arizona State Implementation Plan. This submittal proposes SIP-approval for newly adopted rules establishing RACM for general fugitive dust sources within the West Pinal PM10 NAA.

If you have any question, please contact me at the number shown below or Scott DiBiase at (520)866-6969.

Sincerely,

Michael Sundblom
Director
Pinal County Air Quality Control District
(520)866-6915

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Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

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1. Table of Contents
2. Legal Adoption Authority
   a. Kevin Costello, Deputy County Attorney, November 24, 2015 Memo – Authority to Adopt Resolution No. 102815-AQ2.
3. Clean Copy of SIP Changes
   a. "CLEAN COPY" as amended October 28, 2015.
4. Strikeout Copy of SIP Changes
   a. "STRIKEOUT COPY" as amended October 28, 2015.
5. Public Notice
   a. Construction fugitive dust rulemaking stakeholder meeting, public notice, public comment period email and attachments (Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding) from Nelda Nunez to stakeholders (8/6/15 12:23 p.m.).
   b. Arizona Administrative Register (AAR) Agency Receipt (8/7/15 2:12 pm) – Notice of Proposed Rulemaking Docket Opening, Intended for publication on August 28, 2015.
   c. Arizona Administrative Register (AAR) (8/7/15 2:12 pm) – Notice of Proposed Rulemaking Docket Opening, Intended for publication on August 28, 2015.
   d. Arizona Administrative Register (AAR) Agency Receipt (8/7/15 2:12 pm) – Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding, Intended for publication on August 28, 2015.
   e. Arizona Administrative Register (AAR) (8/7/15 2:13 pm) – Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding Intended for publication on August 28, 2015.
   f. Posting Certification of Notice, Public Notice Air Quality Proposed Rulemaking, Public Comment Period & Oral Proceeding – August 7, 2015, Signed by Tanya Palmos, Secretary, Pinal County Air Quality Control District.
   g. Florence Reminder & Blade Tribune invoice and affidavit of publication – August 27, 2015 publication, Public Notice, Air Quality Proposed Rulemaking Public Comment Period & Oral Proceeding.
   h. Arizona Administrative Register (AAR) Notice of Rulemaking Docket Opening, 21 AAR pages 1730-1731, August 28, 2015.
   i. Arizona Administrative Register (AAR) Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding, 21 AAR page 1731-1745, August 28, 2015.

Air Quality Control District
31 N. Pinal Street, Bldg F, P.O. Box 987 Florence, AZ 85132 **T** 520-866-6929 **F** 520-866-6967 www.pinalcountyaz.gov

j. General Fugitive Dust rule Stakeholder Meeting agenda (Tuesday, September 1, 2015, 10 a.m., Ocotillo Room).
k. Draft General Fugitive Dust rule stakeholder meeting sign-in sheet (September 1, 2015, 1 p.m., Ocotillo Room, Building F).
l. Arizona Department of Environmental Quality (ADEQ) Handout from 9/1/15 stakeholder meeting – Pinal County PM_{10} Nonattainment Area SIP Overview.
m. Pinal County presentation – Pinal County Draft General Fugitive Dust Rule.
n. Florence Reminder & Blade Tribune invoice and affidavit of publication. September 17, 2015 publication. Public Notice, Proposed Rulemaking, Board of Supervisors Public Hearing.
o. Casa Grande Dispatch invoice and affidavit of publication. September 17, 2015 publication. Public Notice, Proposed Rulemaking, Board of Supervisors Public Hearing.
p. Posting Certification of Notice, Public Notice Proposed Rulemaking, Board of Supervisors Public Hearing – September 16, 2015, Signed by Tanya Palmos, Secretary, Pinal County Air Quality Control District.
q. Public Notice – Pinal County Air Quality rulemakings – Public Notice Board of Supervisors Public Hearing October 28, 2015. Emailed (September 11, 2015 10:12 a.m.) from Nelda Nunez to stakeholders – no attachment.
r. Public Notice – Pinal County Air Quality rulemakings – Public Notice Board of Supervisors Public Hearing October 28, 2015. Emailed (September 15, 2015 7:52 a.m.) from Scott DiBiase, with attachment (public notices).
s. General Fugitive Dust Proposed Rulemaking Oral Proceeding agenda, Monday, September 28, 2015, Building F, Ocotillo room.
t. General Fugitive Dust Proposed Rulemaking Oral Proceeding Sign-in sheet, Monday, September 28, 2015, Building F, Ocotillo room.

6. Public Comment
   a. Pinal County Air Quality Concise Explanatory Statement which includes comments received and response to comments.
7. Evidence of Legal Adoption
   a. BOS Agenda Item for October 28, 2015 BOS meeting including Pinal County Board of Supervisors Resolution No. 102815-AQ2 and Concise Explanatory Statement.
   b. Notice of Public Meeting and Executive Session Pinal County Board of Supervisors Summary of Agenda for Regular Session, Wednesday, October 28, 2015.

c. October 28, 2015 Pinal County Board of Supervisors Regular Session Minutes – For brevity purposes (summary of minutes from the meeting total 128 pages), only front page and pertinent pages for air quality Public Hearing (pages 16-17) of the October 28, 2015 BOS Regular Session minutes are included in the binder.
d. Powerpoint presentation given by Michael Sundblom, Director of Pinal County Air Quality Control District to Pinal County Board of Supervisors at the October 28, 2015 Public Hearing.
e. Signed copy of the BOS agenda item and 102815-AQ2 resolution.
f. Agency Receipt (October 30, 2015, 10:33 a.m.), Notice of Final Rulemaking – intended for publication on November 20, 2015.
g. Arizona Administrative Register time stamped copy (October 30, 2015 10:33 a.m.) of the Notice of Final Rulemaking – intended for publication on November 20, 2015.
h. Arizona Administrative Register (AAR) Notice of Final Rulemaking, 21 AAR pages 2925-2937, November 20, 2015.

8. Technical Materials
   a. "SIP Submittal" checklist.
   b. SIP Enforceability Checklist.
9. Digital Copy – CD with the following files
   a. PCAQCD_RACM_General_Fugitive_Dust.pdf - entire SIP submittal package

2. LEGAL ADOPTION AUTHORITY

OFFICE OF THE PINAL COUNTY ATTORNEY

M E M O R A N D U M

To: Concerned Citizens

From: Kevin Costello, Deputy County Attorney– CIVIL DIVISION

Date: November 24, 2015

Subject: Authority to Adopt Resolution No. 102815-AQ2

Subject to Compliance with the statutorily required mechanics-of-adoption, the Pinal County Board of Supervisors has specific authority to adopt and implement rules to control the release into the atmosphere of air contaminants originating within the territorial limits of the County.

Authority to Adopt Rules

Subject to certain procedural requirements, the Pinal County Board of Supervisors has authority to adopt "such rules as it determines are necessary and feasible to control the release into the atmosphere of air contaminants originating within the territorial limits of the County". A.R.S. § 49-479(A) (2008). The statutory prerequisites include a requirement for a statutorily defined public process prior to adoption. See A.R.S. § 49-471.01, *et seq.* (2008). The statutory prerequisites also include a requirement for a justification for rules that are more stringent than those of the Arizona Department of Environmental Quality, See A.R.S. § 49-112(A)(2008); and a limitation that the fee or cost for any permit or approval must not exceed the fee or cost of obtaining a similar permit or approval from the Arizona Department of Environmental Quality. See A.R.S. §§ 49-112(A) and (B), (2008).

Authority to Implement Rules

In addition, the Board of Supervisors has authority to authorize a department to carry out the necessary investigations, inspections and enforcement of any rules adopted pursuant to prevailing statutory authority. See A.R.S. §§ 49-473(B), 49-502, 49-510, 49-511, 49-512, 49-513, 49-514 and 49-515, (2008).

Authority to Adopt and Implement Resolution No. 102815-AQ2

In the case of Pinal County Board of Supervisors Resolution No. 102815-AQ2, the recitations in the resolution recite compliance with statutory notification requirements for adoption.

Since the adopted rule does not directly impose or establish a fee, the statutory limits on fee-imposition do not apply.

Therefore, on behalf of the Office of the Pinal County Attorney, I conclude that the Pinal County Board of Supervisors had authority to adopt, and has continuing authority to implement the rule revisions embodied in Resolution No. 102815-AQ2.

P.O. BOX 887, FLORENCE, AZ 85132 | MAIN: 520.866.6271 |
| FAX: 520.866.6521 |

3. CLEAN COPY OF SIP CHANGES

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

CODE OF REGULATIONS

"CLEAN COPY"

AS AMENDED OCTOBER 28, 2015

PREPARED BY

AIR QUALITY CONTROL DISTRICT STAFF

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).

c. Reserved.
d. Article 4 (As amended 6/3/09).
e. Article 5 (As amended 6/3/09).
f. Reserved.
g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
   i. §4-9-320 (As amended 6/3/09)
   ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]

9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010 General Applicability

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.

a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.

9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule,

maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

   A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.
   B. The owner and/or operator shall implement applicable control measures.
   C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.
   D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

   i. Apply and maintain water or dust suppressants; or

ii. Establish vegetation; or
iii. Install and maintain pavement; or
iv. Apply and maintain gravel uniformly; or
v. Apply and maintain chemical/organic stabilizers/suppressants; or
vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.
   iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or
   ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or
   iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or
   iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or
   v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES**:

a. Pave; or
b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or
c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or
d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES**:

a. Pave; or
b. Apply and maintain dust suppressants other than water; or
c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and
2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

   i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)
      a. Manually sweeping and picking up; or
      b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
      c. Operating a PM10 efficient street sweeper; or
      d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

   ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

   iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.
   ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.
B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
    i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.
    ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

4. STRIKEOUT COPY OF SIP CHANGES

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

CODE OF REGULATIONS

"STRIKEOUT COPY"

AS AMENDED OCTOBER 28, 2015

PREPARED BY

AIR QUALITY CONTROL DISTRICT STAFF

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).

c. Reserved.
d. Article 4 (As amended 6/3/09).
e. Article 5 (As amended 6/3/09).
f. Reserved.
g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
   i. §4-9-320 (As amended 6/3/09)
   ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]

9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~
WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C. , Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.

a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.

9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule,

maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

   A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.
   B. The owner and/or operator shall implement applicable control measures.
   C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.
   D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. OPEN AREAS/VACANT LOTS

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

   i. Apply and maintain water or dust suppressants; or

ii. Establish vegetation; or
iii. Install and maintain pavement; or
iv. Apply and maintain gravel uniformly; or
v. Apply and maintain chemical/organic stabilizers/suppressants; or
vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.
   iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or
   ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or
   iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or
   iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or
   v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES:**

a. Pave; or
b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or
c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or
d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply and maintain dust suppressants other than water; or

c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and

2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

   i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)
      a. Manually sweeping and picking up; or
      b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
      c. Operating a PM10 efficient street sweeper; or
      d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

   ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

   iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.
   ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.
B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
   i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.
   ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

5. PUBLIC NOTICE

Scott DiBiase

From: Nelda Nunez
Sent: Thursday, August 06, 2015 12:23 PM
To: 'Amanda McGennis'; 'Amy Courson'; 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brad Steinke'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'George Hoffman (ghoffman@ajcity.net)'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; 'hkrauss@ci.eloy.az.us'; 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson (jimt@casagrandeaz.gov)'; 'jmehta@marana.com'; 'Jo Crumbaker (jcrumbaker@mail.maricopa.gov)'; 'Joe Sigg (joesigg@azfb.org)'; 'John Insalaco (jmason@ajcity.net)'; 'John Kross (john.kross@queencreek.org)'; 'Jon Post (jpost@marana.com)'; 'Joonwon Joo (jjoo@azdot.gov)'; 'Joseph Nagy - City of Eloy (jnagy@ci.eloy.az.us)'; 'Juan Ponce (publicworks@townofmammoth.com)'; 'Julia Gusse (julia.gusse@maricopa-az.gov)'; 'Karl Montoya (kmontoya@casagrandeaz.gov)'; 'Kazi Haque (kazi.haque@maricopa-az.gov)'; 'Kevin Boesch (kboesch@ladaz.com)'; 'Kevin Louis (klouis@casagrandeaz.gov)'; 'Kevin Wanttaja - Salrt River Project (kevin.wantaja@srpnet.com)'; 'khall@cagaz.org'; 'Larry Hawke - Pima County Department of Environmental Quality (larry.hawke@pima.gov)'; 'ldunagan@ci.eloy.az.us'; 'Leroy Williams (williams@gilanet.net)'; 'lfitzgibbons@casagrandeaz.gov'; 'Lindy Bauer (lbauer@mag.maricopa.gov)'; 'Lisa Garcia (lisa.garcia@florenceaz.gov)'; 'Louis Manuel Jr (lmanuel@ak-chin.nsn.us)'; 'Maeve Clancy (clancy.maeve@epa.gov)'; 'Margaret Gaston (townmanager@superior-arizona.com)'; 'mark.eckhoff@florenceaz.gov'; 'Marvin Brown (marvin.brown@maricopa-az.gov)'; 'Mary Kortsen (mkortsen@casagrandeaz.gov)'; 'massey.eric@azdeq.gov'; 'Matt Herman (mherman@casagrandeaz.gov)'; 'Michael Curtis (mcurtis401@aol.com)'; 'Michael Jackson (cactus2yelap@hotmail.com)'; 'Michael Wesley (mwesley@khov.com)'; 'Morgan Holmes (mholmes@cgsuslaw.com)'; 'mrichardson@asarco.com'; 'nancy.nesky@aps.com'; 'Nick Simonetta (nick@pivotalpolicyconsulting.com)'; 'Norman Hinz (nhinz@pinalfeeding.com)'; 'Ole Solberg (ole@solbergengineering.com)'; 'Patrick Bray (pbray@arizonabeef.org)'; 'Patti Comerford (pcomerford@marana.com)'; 'Paul Jepson (paul.jepson@maricopa-az.gov)'; 'Peggy Chapados (peggy.chapados@maricopa-az.gov)'; Pete Rios; 'Phil McNeely (pmcneely@mail.maricopa.gov)'; 'Ralph Varela (rvarela@casagrandeaz.gov)'; 'Ramona Simpson (ramona.simpson@queencreek.org)'; 'Randy Schroeder (info@envalue.us)'; 'Richard Grimaldi (richard.grimaldi@pima.gov)'; 'Rick Lavis - Arizona Cotton Growers Association ()'; 'rios.gerardo@epamail.epa.gov';

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Cc: Michael Sundblom; Scott DiBiase

Subject: General Fugitive Dust rulemaking

Attachments: PCAQCD NPR GENERAL Fugitive Dust.pdf

Stakeholders,

Ongoing violations of the PM10 (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County. A requirement of the redesignation is the development of a State Implementation Plan (SIP). The Arizona Department of Environmental Quality (ADEQ) is the state agency responsible for development and submittal of the SIP to EPA. The SIP includes identification of the problem (i.e. emissions inventory) and a solution to the problem (i.e. rules). The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM10 emissions inventory for the West Pinal PM10 Nonattainment Area. The top three emissions sources in the base year PM10 emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This proposed rulemaking addresses the general fugitive dust emissions associated with a significant portion of windblown dust and unpaved roads.

This proposed rulemaking will include a stakeholder meeting (September 1, 2015, 10 a.m., 31 N. Pinal St., Building F., Ocotillo Room, Florence, AZ.), a 30 day public comment period and a Control Officer Oral Proceeding. The Control Officer Oral Proceeding will be held on September 28, 2015 at 10 a.m. in the Ocotillo Room located at 31 N. Pinal St., Building F, Florence, AZ. Written or oral public comments are due before the close of business on September 28, 2015. The final step in the rulemaking process will be a Pinal County Board of Supervisors Public Hearing. The public hearing will be separately scheduled and publicly noticed. As a stakeholder, you will receive another email at least 30 days prior to the Board of Supervisors Public Hearing informing you of the date, time and location of the meeting.

Please see the attached Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding which has the full text of the proposed general fugitive dust rules. This combined notice will be published in the Arizona Administrative Register on August 28, 2015.

Sincerely,

Scott DiBiase
Pinal County Air Quality

Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

August 7, 2015 - **Intended for Publication on August 28, 2015**

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

COMBINED
NOTICE OF PROPOSED RULEMAKING
PURSUANT TO A.R.S. §49-112 AND §49-471.01 *et seq.*
AND
NOTICE OF ORAL PROCEEDING
PURSUANT TO A.R.S. 49-471.06

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposes that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The proposed rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These proposed general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions

for the aforementioned land use categories. In addition the proposed rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The proposed amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the proposed corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	**Rulemaking Action**
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this proposal may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov. To the extent possible, the District will also post information on the County's website, *pinalcountyaz.gov*, under the "air quality" link.

D. The rule making process will consist of an initial administrative rule development process, including this notice, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee. The date and location for the oral proceeding are set forth below. Written comments are due prior to the close of the comment period, which shall be the close-of-business on the day of the oral proceeding. The final step in the rule adoption process will be a hearing before the Board of Supervisors. The Board of Supervisors hearing will be separately scheduled and noticed in accord with A.R.S. §49-479, and, where applicable, the requirements of 40 C.F.R. §51.102.

E. The proposed revisions include the following:

1. §1-1-105 – Proposed addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Proposed amendment of Chapter 4, Article 1, §010,
    - Proposed amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Proposed removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.

3. Proposed addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:
    - Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
    - Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
    - Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
    - Dust generating operations (i.e. construction).
    - Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
4. Proposed addition of Chapter 4, Article 1, §020 (Definitions),
    - Sixteen definitions directly related to these rules.
5. Proposed addition of Chapter 4, Article 1, §030 (Standards)
    - Subsection 1 – General requirements
        A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.
        B. The owner and/or operator shall implement applicable control measures.
        C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.
        D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.
    - Subsection 2 – Open areas/vacant lots
        A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
        B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
        C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.
        D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.

E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.

F. Compliance determination.

- Subsection 3- Unpaved lots
  - A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
  - B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.
- Subsection 4 – Unpaved roads
  - A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
  - B. Control measures are considered effectively implemented when:
    - i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
      - a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
        - i. Done on unpaved roads previously untreated, and
        - ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
    - iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.
- Subsection 5 – Paved public roadway
  - A. Trackout cleanup provisions for trackout that extends 50 feet or more.
    - i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
    - ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
    - iii. Trackout cleanup extension provision
  - B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Proposed addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Proposed addition of Chapter 4, Article 1, §050 (Records retention)

   Two year records retention requirement.

8. Proposed addition of Chapter 4, Article 1, §060 (Violations)

   Violation provisions for these rules.

   Violation exemptions include:

   i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.
   ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

   Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

   Open areas/Vacant lots

   There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the proposed general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the proposed 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the proposed 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The proposed rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to the surface area disturbed prior to, during and after the weed abatement. The proposed rules include additional trackout requirements associated with weed abatement activities. All of these new proposed restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the proposed general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold proposed (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the proposed rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection 4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road is $100,000 per mile. Assuming the 15 miles per year requirement in 4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the proposed rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain

percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The proposed rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The proposed changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these proposed changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the proposed rule or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, ###, August 28, 2015.

L. Date, time and location of oral proceeding:

1) Oral Proceeding

Date: September 28, 2015

Time: 10 a.m.

Location: 31 N. Pinal St., Florence, AZ.
Building F, Ocotillo room

Nature of meeting: Oral proceeding before the Control Officer or his designee in accord with A.R.S. §49-471.06(C) to consider public comments upon any or all of this proposal.

2. The full text of the proposed changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, ##/##/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.

d. Article 4 (As amended 6/3/09).
e. Article 5 (As amended 6/3/09).
f. Reserved.
g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
   i. §4-9-320 (As amended 6/3/09)
   ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*

13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~
WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C., Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control FUGITIVE DUST from OPEN AREAS/VACANT LOTS, UNPAVED ROADS, UNPAVED LOTS and PAVED PUBLIC ROADWAYS by requiring measures to prevent, reduce or mitigate FUGITIVE DUST emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to Emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the OWNER AND/OR

OPERATOR, including acts of God. Activities by an OWNER AND/OR OPERATOR to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.

3. The standards and requirements of this Article shall not apply to Normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to DUST GENERATING OPERATIONS subject to the standards and/or requirements described in Chapter 4, Article 10.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of FUGITIVE DUST in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, deSTABILIZED, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing FUGITIVE DUST emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the OWNER AND/OR OPERATOR, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the

ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, FUGITIVE DUST does not include particulate matter emitted directly from the exhaust of MOTOR VEHICLEs and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform MOTOR VEHICLE Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
    a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
    b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
    c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and

c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously DISTURBED SURFACE AREA which, through the application of CONTROL MEASURES, shows visual or other evidence of surface crusting and is resistant to wind-driven FUGITIVE DUST.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of MOTOR VEHICLEs, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing MOTOR VEHICLEs and equipment. An UNPAVED LOT includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.
16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not PAVED. UNPAVED ROADs are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an UNPAVED ROAD is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

A. The OWNER AND/OR OPERATOR of OPEN AREAS/VACANT LOTS, UNPAVED LOTS, UNPAVED ROADS and PAVED PUBLIC ROADWAYS shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.

B. The OWNER AND/OR OPERATOR shall implement applicable CONTROL MEASURES.

C. CONTROL MEASURES shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.

D. Failure to implement CONTROL MEASURES as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The OWNER AND/OR OPERATOR of OPEN AREAS/VACANT LOTS shall not cause, suffer, allow, or permit FUGITIVE DUST emissions which result in opacity of the dust to exceed twenty percent

(20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in OPEN AREAS/VACANT LOTS, an OWNER AND/OR OPERATOR shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective CONTROL MEASURES to effectively prevent access to the OPEN AREAS/VACANT LOTS.

C. OWNERS AND/OR OPERATORS of OPEN AREAS/VACANT LOTS 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more DISTURBED SURFACE AREA shall implement at least one CONTROL MEASURE described below on the DISTURBED SURFACE AREA in order to stabilize:

   i. Apply and maintain water or dust suppressants; or
   ii. Establish vegetation; or
   iii. Install and maintain pavement; or
   iv. Apply and maintain gravel uniformly; or
   v. Apply and maintain chemical/organic stabilizers/suppressants; or
   vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For OPEN AREAS/VACANT LOTS 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more DISTURBED SURFACE AREA, within 30 calendar days following the initial discovery of the DISTURBED SURFACE AREA on the OPEN AREAS/VACANT LOTS, the OWNER AND/OR OPERATOR shall sign up to receive the PINAL COUNTY DUST CONTROL FORECAST. The OWNER AND/OR OPRATOR shall ensure the OPEN AREAS/VACANT LOTS is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the PINAL COUNTY DUST CONTROL FORECAST.

E. No person shall remove vegetation from any OPEN AREAS/VACANT LOTS by blading, disking, plowing under or any other means without implementing all of the following CONTROL MEASURES to prevent or minimize FUGITIVE DUST.
   i. Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material TRACKOUT onto paved surfaces and access points adjoining paved surfaces through one of the CONTROL MEASURES in 4-1-030.5.A.i.
   iii. Apply a DUST SUPPRESSANT (s), gravel, compaction or an alternative CONTROL MEASURE immediately following weed abatement to the entire DISTURBED SURFACE AREA such that the surface is STABILIZED.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or

ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or

iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or

iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or

v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The OWNER AND/OR OPERATOR of an UNPAVED LOT greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the CONTROL MEASURES described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The OWNER AND/OR OPERATOR of an UNPAVED LOT shall not cause or allow visible FUGITIVE DUST emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the OWNER AND/OR OPERATOR shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply DUST SUPPRESSANT in sufficient quantity and frequency to maintain a STABILIZED surface; or

c. Apply and maintain surface gravel uniformly such that the surface is STABILIZED; or

d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. CONTROL MEASURE(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the UNPAVED LOT meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The OWNER AND/OR OPERATOR of UNPAVED ROADS with average daily trips (ADT) greater than 150 (A traffic count shall measure MOTOR VEHICLE traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. MOTOR VEHICLE traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the CONTROL MEASURES described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The OWNER AND/OR OPERATOR of UNPAVED ROADS shall not cause or allow visible FUGITIVE DUST emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the OWNER AND/OR OPERATOR shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES:**

a. Pave; or
b. Apply and maintain DUST SUPPRESANTS other than water; or
c. Uniformly apply and maintain surface gravel

B. CONTROL MEASURE(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the CONTROL MEASURES described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of UNPAVED ROADS having ADT of 150 or more.

a. When the CONTROL MEASURE is application and maintenance of DUST SUPPRESANTS other than water, the application and maintenance of the DUST SUPPRESANTS shall only be counted towards the 15 mile threshold when:

1. Done on UNPAVED ROADS previously untreated, and
2. Application and maintenance of DUST SUPPRESANTS on UNPAVED ROADS previously treated continues annually until the UNPAVED ROAD is paved.

ii. For year 2019 and beyond, CONTROL MEASURES applied on UNPAVED ROADS with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of UNPAVED ROADS with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent UNPAVED ROADS.

5. PAVED PUBLIC ROADWAY

A. Clean up of TRACKOUT, Erosion-Caused Deposition of Bulk Materials on PAVED PUBLIC ROADWAY: the OWNER AND/OR OPERATOR of the property from which the TRACKOUT or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the PAVED PUBLIC ROADWAY shall:

   i. Within 24 hours of discovery, remove the mud/dirt from PAVED PUBLIC ROADWAY with one of the following CONTROL MEASURES. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the PAVED PUBLIC ROADWAY)
      i. Manually sweeping and picking up; or
      ii. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
      iii. Operating a PM10 efficient street sweeper; or
      iv. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program

   ii. During removal of mud/dirt, do so in a manner that does not cause another source of FUGITIVE DUST.

   iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The OWNER AND/OR OPERATOR of any existing PAVED PUBLIC ROADWAYs shall take the following actions prior to, during and after work on UNPAVED ROAD shoulders:
   i. Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a STABILIZED surface.
   ii. Prevent TRACKOUT by using one of the CONTROL MEASURES listed in 4-1-030.5.A.1.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of CONTROL MEASURE application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or CONTROL MEASURE, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing PAVED PUBLIC ROADWAY and UNPAVED ROADS shall take the following actions:

A. By January 30 of each year provide the DISTRICT with a list of all UNPAVED ROADS under its jurisdiction, including data on length of, and ADT (if available) on, each UNPAVED ROAD segment.
B. By January 30 of each year, submit to the District a list of UNPAVED ROADS which were paved during the previous year including the total number of UNPAVED ROADS miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by 4-1-040 (Recordkeeping) and 4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
   i. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements if applicable CONTROL MEASURES are implemented, applied and maintained, and all dust contributing DISTURBED SURFACE AREAs are STABILIZED.
   ii. EMERGENCY maintenance of flood control channels and water retention basins if at least 1 applicable CONTROL MEASURE is applied, and maintained.

SECRETARY OF STATE

2015 AUG -7 PM 2:12

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AGENCY RECEIPT

NOTICE OF PROPOSED RULEMAKING DOCKET OPENING

This receipt accompanies hard-copies and disk publication submittals entitled:

a. Agency name: Pinal County Air Quality Control District
P.O. Box 987
Florence, Arizona 85132
(520)866-6929
(520)866-6967 FAX

b. "NOTICE OF RULEMAKING DOCKET OPENING" which is dated August 7, 2015 - intended for publication on August 28, 2015.

The proposed revisions to local air quality rules involve amending and adding a number of sections in the rules including but not limited to:

§1-1-105 SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

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August 7, 2015 - ***Intended for Publication on August 28, 2015***

PINAL COUNTY

NOTICE OF PROPOSED RULEMAKING DOCKET OPENING
(Ref. A.R.S. §41-1021)

1. **Title and its heading:** Pinal County Air Quality Control District Code of Regulations
Regulations and headings: Chapter 1, Article 1, Section 105 – SIP List
Chapter 4.Article 1 – Adopted Documents

Rules and headings:
§1-1-105. SIP List
§4-1-010. Adopted document(s)
§4-1-015. Exemptions
§4-1-020. Definitions
§4-1-030. Standards
§4-1-040. Recordkeeping
§4-1-045. Reporting Requirements
§4-1-050. Records Retention
§4-1-060. Violations

2. **Subject Matter of the Proposed Rule**

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County, the Environmental Protection Agency (EPA) in 2012 designated a large portion of Pinal County as a moderate nonattainment area (West Pinal PM_{10} Nonattainment Area). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust, unpaved roads and construction.

PCAQCD will follow up this proposed rulemaking docket opening with a formal rulemaking proposal in which the rules currently in Chapter 4, Article 1 will be proposed to be amended in order to replace them with general fugitive dust rules that will achieve the emissions reductions in the West Pinal PM_{10} Nonattainment. The ultimate goal of the proposed rulemaking will be adoption of the rules by the Pinal County Board of Supervisors and submittal to EPA (through ADEQ) for inclusion into the Arizona SIP.

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

3. Prior Related Notices

None

4. Contact Information

Those wishing further information regarding any aspect of this proposal may contact

Name:	Scott DiBiase,
Title:	Air Quality Planning Manager
Address:	Pinal County Air Quality
	31 North Pinal St., Building F, Florence, Arizona, 85132
Telephone:	520-866-6929
Fax:	520-866-6967
E-mail:	scott.dibiase@pinalcountyaz.gov

To the extent possible, the District will also post information on the County's website, *www.pinalcountyaz.gov*, under the "air quality" link.

5. Opportunity for Written or Oral Comments

The District will publish a Notice of Proposed Rulemaking that will define a formal timetable for submittal of written comments. At any time prior to the close of that to-be-defined comment period, anyone may seek information or submit comments by contacting the Planning Manager at the address shown above. Ultimately, the public will also have an opportunity to offer comment in the public hearing before the Board of Supervisors.

6. Anticipated Timetable

To be announced in the Notice of Proposed Rulemaking.

SECRETARY OF STATE

2015 AUG -7 PM 2: 12

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AGENCY RECEIPT

COMBINED NOTICE OF PROPOSED RULEMAKING AND NOTICE OF ORAL PROCEEDING

This receipt accompanies hard-copies and disk publication submittals entitled:

a. Agency name: Pinal County Air Quality Control District
P.O. Box 987
Florence, Arizona 85132
(520)866-6929
(520)866-6967 FAX

b. "COMBINED NOTICE OF PROPOSED RULEMAKING AND NOTICE OF ORAL PROCEEDING" which is dated August 7, 2015 - intended for publication on August 28, 2015.

The proposed revisions to local air quality rules involve amending and adding a number of sections in the rules including but not limited to:

§1-1-105 SIP List ..... Amend
§4-1-010. Adopted document(s) ..... Amend
§4-1-015. Exemptions ..... New
§4-1-020. Definitions ..... New
§4-1-030. Standards ..... New
§4-1-040. Recordkeeping ..... New
§4-1-045. Reporting Requirements ..... New
§4-1-050. Records Retention ..... New
§4-1-060. Violations ..... New

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

SECRETARY OF STATE

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Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

August 7, 2015 - **Intended for Publication on August 28, 2015**

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

COMBINED
NOTICE OF PROPOSED RULEMAKING
PURSUANT TO A.R.S. §49-112 AND §49-471.01 *et seq.*
AND
NOTICE OF ORAL PROCEEDING
PURSUANT TO A.R.S. 49-471.06

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposes that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The proposed rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These proposed general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions

for the aforementioned land use categories. In addition the proposed rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The proposed amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the proposed corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	**Rulemaking Action**
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this proposal may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov. To the extent possible, the District will also post information on the County's website, *pinalcountyaz.gov*, under the "air quality" link.

D. The rule making process will consist of an initial administrative rule development process, including this notice, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee. The date and location for the oral proceeding are set forth below. Written comments are due prior to the close of the comment period, which shall be the close-of-business on the day of the oral proceeding. The final step in the rule adoption process will be a hearing before the Board of Supervisors. The Board of Supervisors hearing will be separately scheduled and noticed in accord with A.R.S. §49-479, and, where applicable, the requirements of 40 C.F.R. §51.102.

E. The proposed revisions include the following:

1. §1-1-105 – Proposed addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Proposed amendment of Chapter 4, Article 1, §010,
    - Proposed amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Proposed removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.

3. Proposed addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:
    - Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
    - Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
    - Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
    - Dust generating operations (i.e. construction).
    - Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
4. Proposed addition of Chapter 4, Article 1, §020 (Definitions),
    - Sixteen definitions directly related to these rules.
5. Proposed addition of Chapter 4, Article 1, §030 (Standards)
    - Subsection 1 – General requirements
        A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.
        B. The owner and/or operator shall implement applicable control measures.
        C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.
        D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.
    - Subsection 2 – Open areas/vacant lots
        A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
        B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
        C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.
        D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.

E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.

F. Compliance determination.

- Subsection 3- Unpaved lots
  - A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
  - B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.
- Subsection 4 – Unpaved roads
  - A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
  - B. Control measures are considered effectively implemented when:
    - i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
      - a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
        - i. Done on unpaved roads previously untreated, and
        - ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
    - iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.
- Subsection 5 – Paved public roadway
  - A. Trackout cleanup provisions for trackout that extends 50 feet or more.
    - i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
    - ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
    - iii. Trackout cleanup extension provision
  - B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Proposed addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Proposed addition of Chapter 4, Article 1, §050 (Records retention)

   Two year records retention requirement.

8. Proposed addition of Chapter 4, Article 1, §060 (Violations)

   Violation provisions for these rules.

   Violation exemptions include:

   i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.
   ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

   Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

   Open areas/Vacant lots

   There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the proposed general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the proposed 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the proposed 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The proposed rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to the surface area disturbed prior to, during and after the weed abatement. The proposed rules include additional trackout requirements associated with weed abatement activities. All of these new proposed restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the proposed general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold proposed (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the proposed rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection 4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road is $100,000 per mile. Assuming the 15 miles per year requirement in 4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the proposed rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain

percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The proposed rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The proposed changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these proposed changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the proposed rule or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, ###, August 28, 2015.

L. Date, time and location of oral proceeding:

1) Oral Proceeding

Date: September 28, 2015

Time: 10 a.m.

Location: 31 N. Pinal St., Florence, AZ.
Building F, Ocotillo room

Nature of meeting: Oral proceeding before the Control Officer or his designee in accord with A.R.S. §49-471.06(C) to consider public comments upon any or all of this proposal.

2. The full text of the proposed changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, ##/##/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.

d. Article 4 (As amended 6/3/09).
e. Article 5 (As amended 6/3/09).
f. Reserved.
g. Article 7 (As amended 6/3/09)
h. Reserved.
i. Article 9, limited to:
   i. §4-9-320 (As amended 6/3/09)
   ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*

13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~ WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C. , Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control FUGITIVE DUST from OPEN AREAS/VACANT LOTS, UNPAVED ROADS, UNPAVED LOTS and PAVED PUBLIC ROADWAYS by requiring measures to prevent, reduce or mitigate FUGITIVE DUST emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to Emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the OWNER AND/OR

OPERATOR, including acts of God. Activities by an OWNER AND/OR OPERATOR to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.

3. The standards and requirements of this Article shall not apply to Normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to DUST GENERATING OPERATIONS subject to the standards and/or requirements described in Chapter 4, Article 10.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of FUGITIVE DUST in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, deSTABILIZED, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing FUGITIVE DUST emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the OWNER AND/OR OPERATOR, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the

ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, FUGITIVE DUST does not include particulate matter emitted directly from the exhaust of MOTOR VEHICLEs and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.

7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform MOTOR VEHICLE Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
    a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
    b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
    c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and

c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously DISTURBED SURFACE AREA which, through the application of CONTROL MEASURES, shows visual or other evidence of surface crusting and is resistant to wind-driven FUGITIVE DUST.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of MOTOR VEHICLEs, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing MOTOR VEHICLEs and equipment. An UNPAVED LOT includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.
16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not PAVED. UNPAVED ROADs are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an UNPAVED ROAD is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

A. The OWNER AND/OR OPERATOR of OPEN AREAS/VACANT LOTS, UNPAVED LOTS, UNPAVED ROADS and PAVED PUBLIC ROADWAYS shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.

B. The OWNER AND/OR OPERATOR shall implement applicable CONTROL MEASURES.

C. CONTROL MEASURES shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.

D. Failure to implement CONTROL MEASURES as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The OWNER AND/OR OPERATOR of OPEN AREAS/VACANT LOTS shall not cause, suffer, allow, or permit FUGITIVE DUST emissions which result in opacity of the dust to exceed twenty percent

(20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in OPEN AREAS/VACANT LOTS, an OWNER AND/OR OPERATOR shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective CONTROL MEASURES to effectively prevent access to the OPEN AREAS/VACANT LOTS.

C. OWNERS AND/OR OPERATORS of OPEN AREAS/VACANT LOTS 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more DISTURBED SURFACE AREA shall implement at least one CONTROL MEASURE described below on the DISTURBED SURFACE AREA in order to stabilize:

   i. Apply and maintain water or dust suppressants; or
   ii. Establish vegetation; or
   iii. Install and maintain pavement; or
   iv. Apply and maintain gravel uniformly; or
   v. Apply and maintain chemical/organic stabilizers/suppressants; or
   vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For OPEN AREAS/VACANT LOTS 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more DISTURBED SURFACE AREA, within 30 calendar days following the initial discovery of the DISTURBED SURFACE AREA on the OPEN AREAS/VACANT LOTS, the OWNER AND/OR OPERATOR shall sign up to receive the PINAL COUNTY DUST CONTROL FORECAST. The OWNER AND/OR OPRATOR shall ensure the OPEN AREAS/VACANT LOTS is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the PINAL COUNTY DUST CONTROL FORECAST.

E. No person shall remove vegetation from any OPEN AREAS/VACANT LOTS by blading, disking, plowing under or any other means without implementing all of the following CONTROL MEASURES to prevent or minimize FUGITIVE DUST.
   i. Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material TRACKOUT onto paved surfaces and access points adjoining paved surfaces through one of the CONTROL MEASURES in 4-1-030.5.A.i.
   iii. Apply a DUST SUPPRESSANT (s), gravel, compaction or an alternative CONTROL MEASURE immediately following weed abatement to the entire DISTURBED SURFACE AREA such that the surface is STABILIZED.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or

ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or

iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or

iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or

v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The OWNER AND/OR OPERATOR of an UNPAVED LOT greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the CONTROL MEASURES described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The OWNER AND/OR OPERATOR of an UNPAVED LOT shall not cause or allow visible FUGITIVE DUST emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the OWNER AND/OR OPERATOR shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES**:

a. Pave; or

b. Apply DUST SUPPRESSANT in sufficient quantity and frequency to maintain a STABILIZED surface; or

c. Apply and maintain surface gravel uniformly such that the surface is STABILIZED; or

d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. CONTROL MEASURE(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the UNPAVED LOT meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The OWNER AND/OR OPERATOR of UNPAVED ROADS with average daily trips (ADT) greater than 150 (A traffic count shall measure MOTOR VEHICLE traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. MOTOR VEHICLE traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the CONTROL MEASURES described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The OWNER AND/OR OPERATOR of UNPAVED ROADS shall not cause or allow visible FUGITIVE DUST emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the OWNER AND/OR OPERATOR shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES**:

a. Pave; or
b. Apply and maintain DUST SUPPRESANTS other than water; or
c. Uniformly apply and maintain surface gravel

B. CONTROL MEASURE(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the CONTROL MEASURES described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of UNPAVED ROADS having ADT of 150 or more.

a. When the CONTROL MEASURE is application and maintenance of DUST SUPPRESANTS other than water, the application and maintenance of the DUST SUPPRESANTS shall only be counted towards the 15 mile threshold when:

1. Done on UNPAVED ROADS previously untreated, and
2. Application and maintenance of DUST SUPPRESANTS on UNPAVED ROADS previously treated continues annually until the UNPAVED ROAD is paved.

ii. For year 2019 and beyond, CONTROL MEASURES applied on UNPAVED ROADS with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of UNPAVED ROADS with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent UNPAVED ROADS.

5. **PAVED PUBLIC ROADWAY**

A. Clean up of TRACKOUT, Erosion-Caused Deposition of Bulk Materials on PAVED PUBLIC ROADWAY: the OWNER AND/OR OPERATOR of the property from which the TRACKOUT or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the PAVED PUBLIC ROADWAY shall:

i. Within 24 hours of discovery, remove the mud/dirt from PAVED PUBLIC ROADWAY with one of the following CONTROL MEASURES. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the PAVED PUBLIC ROADWAY)
   i. Manually sweeping and picking up; or
   ii. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
   iii. Operating a PM10 efficient street sweeper; or
   iv. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program

ii. During removal of mud/dirt, do so in a manner that does not cause another source of FUGITIVE DUST.

iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The OWNER AND/OR OPERATOR of any existing PAVED PUBLIC ROADWAYs shall take the following actions prior to, during and after work on UNPAVED ROAD shoulders:
   i. Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a STABILIZED surface.
   ii. Prevent TRACKOUT by using one of the CONTROL MEASURES listed in 4-1-030.5.A.1.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of CONTROL MEASURE application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or CONTROL MEASURE, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing PAVED PUBLIC ROADWAY and UNPAVED ROADS shall take the following actions:

A. By January 30 of each year provide the DISTRICT with a list of all UNPAVED ROADS under its jurisdiction, including data on length of, and ADT (if available) on, each UNPAVED ROAD segment.
B. By January 30 of each year, submit to the District a list of UNPAVED ROADS which were paved during the previous year including the total number of UNPAVED ROADS miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by 4-1-040 (Recordkeeping) and 4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
   i. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements if applicable CONTROL MEASURES are implemented, applied and maintained, and all dust contributing DISTURBED SURFACE AREAs are STABILIZED.
   ii. EMERGENCY maintenance of flood control channels and water retention basins if at least 1 applicable CONTROL MEASURE is applied, and maintained.

PINAL COUNTY DEPARTMENT OF DEVELOPMENT SERVICES
AIR QUALITY CONTROL DISTRICT
POST OFFICE BOX 987, FLORENCE, ARIZONA 85232

POSTING CERTIFICATION OF NOTICE

The undersigned hereby certifies that a copy of the attached notice was duly posted at:

(1) Pinal County Administration 1 – Bldg A Lobby on August 7th

(2) Pinal County Treasurer's Office – Bldg E on August 7th

(3) Pinal County Admin 3 – Bldg F Lobby on August 7th

(4) Justice Court – 400 S Central Ave on August 7th

(5) Pinal Co Clerk of the Court – 971 Jason Lopez Ci on August 7th

in accordance with the statement filed by the PINAL COUNTY AIR QUALITY CONTROL ADVISORY COUNCIL with the Clerk of the Pinal County Board of Supervisors.

Dated this 7th day of August, 2015

Tanya R. Palmos
Secretary
Pinal County Air Quality Control District

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
wide open opportunity

Public Notice

Air Quality Proposed Rulemaking

Public Comment Period & Oral Proceeding

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. A formal notice, including the full text of the proposed revisions, will be available in the August 28, 2015 edition of the Arizona Administrative Register, which is available on-line at www.azsos.gov . The ultimate purpose of this proposed rulemaking will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

Ongoing violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County. A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification of the problem (i.e. emissions inventory) and a solution to the problem (i.e. rules). The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area. The top three emissions sources in the base year PM_{10} emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This proposed rulemaking addresses the general fugitive dust emissions associated with a significant portion of windblown dust and unpaved roads.

This proposed rulemaking will include a stakeholder meeting (September 1, 2015, 10 a.m., 31 N. Pinal St., Building F., Ocotillo Room, Florence, AZ.), a 30 day public comment period and a Control Officer Oral Proceeding that will be held on September 28, 2015 at 10 a.m. in the Ocotillo Room located at 31 N. Pinal St., Building F, Florence, AZ.

Written or oral public comments are due before the close of business on September 28, 2015. Copies of the proposal, and additional information, are available from Pinal County Air Quality, 31 North Pinal Street, Florence, AZ. 85132, or by calling 520-866-6929 or online at http://www.pinalcountyaz.gov/AirQuality/Pages/Rulemaking.aspx.

The final step in the rulemaking process will be a Pinal County Board of Supervisors Public Hearing. The public hearing will be separately scheduled and publicly noticed.

31 North Pinal Street, Building F, PO Box 987 Florence, AZ 85232 T 520-866-6929 FREE 888-431-1311 F 520-866-6967 www.pinalcountyaz.gov

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Ruth A. Kramer, President

PINAL COUNTY AIR QUALITY CONTROL DIST.
NELDA NUNEZ
PO BOX 987
FLORENCE, AZ 85132

AUGUST 27, 2015
OUR ORDER NO. 33965
CUSTOMER ORDER NO. 232935

EQUIPMENT TO DO FINE PRINTING - CRAFTSMEN WHO DO IT

DESCRIPTION	PRICE
PUBLIC NOTICE PUBLICATION:	
PUBLIC NOTICE / AIR QUALITY PROPOSED RULEMAKING	
RECEIVED SEP 08 2015 PINAL COUNTY AIR QUALITY	
PUBLISHED ONE (1) TIME 8.0 INCHES PER PUBLICATION	
8.0 INCHES @ $5.48 PER INCH	$ 43.84
TAX 2%	$ 0.88
TOTAL	$ 44.72

BJG

STATE OF ARIZONA }

COUNTY OF PINAL

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& Oral Proceeding

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Ongoing violations of the PM10 (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County. A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification of the problem (i.e. emissions inventory) and a solution to the problem (i.e. rules). The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM10 emissions inventory for the West Pinal PM10 Nonattainment Area. The top three emissions sources in the base year PM10 emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This proposed rulemaking addresses the general fugitive dust emissions associated with a significant portion of windblown dust and unpaved roads.

This proposed rulemaking will include a stakeholder meeting (September 1, 2015, 10 a.m., 31 N. Pinal St., Building F., Ocotillo Room, Florence, AZ.), a 30 day public comment period and a Control Officer Oral Proceeding that will be held on September 28, 2015 at 10 a.m. in the Ocotillo Room located at 31 N. Pinal St., Building F, Florence, AZ.

Written or oral public comments are due before the close of business on September 28, 2015. Copies of the proposal, and additional information, are available from Pinal County Air Quality, 31 North Pinal Street, Florence, AZ. 85132, or by calling 520-866-6929 or online at http://www.pinalcountyaz.gov/AirQuality/Pages/Rulemaking.aspx.

The final step in the rulemaking process will be a Pinal County Board of Supervisors Public Hearing. The public hearing will be separately scheduled and publicly noticed.

No. of publications: 1; date of publication: Aug. 27, 2015.

Affidavit of Publication

RUTH A. KRAMER first being duly sworn deposes and says: That he/she is a native born citizen of the United States of America, over 21 years of age, that I am an agent and/or publisher of the the Florence Reminder & Blade-Tribune, a weekly newspaper published at Florence, Pinal County, Arizona, on Thursday of each week; that a notice, a full, true and complete printed copy of which is hereunto attached, was printed in the regular edition of said newspaper, and not in a supplement thereto, for **ONE** consecutive issues. The first publication thereof having been on the **27TH**

day of **AUGUST** A.D., **2015**

Second publication _____

Third publication _____

Fourth publication _____

Fifth publication _____

Sixth publication _____

FLORENCE REMINDER & BLADE-TRIBUNE

By _____
agent and/or publisher of the Florence Reminder & Blade-Tribune

Sworn to before me this 31st

day of August A.D., 2015

Debbie L. Mumme

Notary Public in and for the County
of Pinal, State of Arizona

Debbie L. Mumme
Notary Public
Pinal County, Arizona
My Comm. Expires 10-23-17

STATE OF ARIZONA }

COUNTY OF PINAL }

Public Notice
Air Quality Proposed Rulemaking
Public Comment Period
& Oral Proceeding

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. A formal notice, including the full text of the proposed revisions, will be available in the August 28, 2015 edition of the Arizona Administrative Register, which is available on-line at www.azsos.gov . The ultimate purpose of this proposed rulemaking will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

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Sworn to before me this 31st

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Debbie L. Mumme

Notary Public in and for the County
of Pinal, State of Arizona

Debbie L. Mumme
Notary Public
Pinal County, Arizona
My Comm. Expires 10-23-17

e. Permit Renewal: The first permit obtained for an affected project must cover a contiguous area (unless it is an "annual area block permit") and is valid for one year from the date of issue. If the project has not been completed at the end of the one-year period, the DUST GENERATING OPERATION permit must be renewed. The OWNER AND/OR OPERATOR shall reapply for a DUST GENERATING OPERATION permit prior to the expiration date of the original permit. Upon renewal, the new permit will be valid starting on the first calendar day after the completion of the initial one year period of the first permit and is valid for one year from that date. Upon renewal, the total acreage covered by the DUST GENERATING OPERATION permit does not have to be contiguous, although all acreage covered by the renewed DUST GENERATING OPERATION permit must have been included in the original DUST GENERATING OPERATION permit.

f. At all sites that are five acres or larger, the OWNER AND/OR OPERATOR shall erect a project information sign at the main entrance that is visible to the public or at each end of the ROAD CONSTRUCTION project site. The sign shall be a minimum of 24 inches tall by 30 inches wide, have a white background, and have the words "DUST CONTROL" shown in black block lettering which is at least four inches high, and shall contain the following information in legible fashion:

i. Project Name

ii. Name and phone number of person(s) responsible for conducting project

iii. Pinal County Air Quality Control District phone number.

4-3-190. Violations

A. Failure by any person to comply with the applicable requirements of this Article shall constitute a violation.

B. Violation Exemptions:

If all records were maintained in accordance with §4-3-180 section (C)(2)(b), the provisions of section §4-3-180 (A)(1) shall not apply to a WORK SITE during:

1. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements of §4-3-180 (A)(1), if all CONTROL MEASURES as specified in the permit, are implemented, applied and maintained, all DISTURBED SURFACE AREAs are STABILIZED, and one of the following:

a. All DUST GENERATING OPERATIONs are ceased until the opacity requirements of §4-3-180(A)(1) are no longer being exceeded; or

b. Maintain documentation that any DUST GENERATING OPERATIONs that are still being performed are not the cause of and do not contribute to the opacity violation. Documentation may include onsite opacityobservations by a certified observer.

2. EMERGENCY maintenance of flood control channels and water retention basins if all CONTROL MEASURES, as specified in the permit are implemented, applied, and maintained.

NOTICE OF RULEMAKING DOCKET OPENING

[M15-212]

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

(Ref. A.R.S. §41-1021)

1. Title and its heading:	Pinal County Air Quality Control District Code of Regulations
Regulations and headings:	Chapter 1, Article 1, Section 105 – SIP List Chapter 4, Article 1 – Adopted Documents
Rules and headings:	§1-1-105. SIP List §4-1-010. Adopted document(s) §4-1-015. Exemptions §4-1-020. Definitions §4-1-030. Standards §4-1-040. Recordkeeping §4-1-045. Reporting Requirements §4-1-050. Records Retention

§4-1-060. Violations

2. Subject Matter of the Proposed Rule:

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County, the Environmental Protection Agency (EPA) in 2012 designated a large portion of Pinal County as a moderate nonattainment area (West Pinal PM_{10} Nonattainment Area). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust, unpaved roads and construction.

PCAQCD will follow up this proposed rulemaking docket opening with a formal rulemaking proposal in which the rules currently in Chapter 4, Article 1 will be proposed to be amended in order to replace them with general fugitive dust rules that will achieve the emissions reductions in the West Pinal PM_{10} Nonattainment. The ultimate goal of the proposed rulemaking will be adoption of the rules by the Pinal County Board of Supervisors and submittal to EPA (through ADEQ) for inclusion into the Arizona SIP.

Also as part of this rulemaking, Pinal County may add, delete or modify additional rules as necessary.

3. Prior Related Notices:

None

4. Contact Information:

Those wishing further information regarding any aspect of this proposal may contact

Name: Scott DiBiase,
Title: Air Quality Planning Manager
Address: Pinal County Air Quality
31 North Pinal St., Building F, Florence, AZ, 85132
Telephone: 520-866-6929
Fax: 520-866-6967
E-mail:scott.dibiase@pinalcountyaz.gov

To the extent possible, the District will also post information on the County's website, *www.pinalcountyaz.gov*, under the "air quality" link.

5. Opportunity for Written or Oral Comments:

The District will publish a Notice of Proposed Rulemaking that will define a formal timetable for submittal of written comments. At any time prior to the close of that to-be-defined comment period, anyone may seek information or submit comments by contacting the Planning Manager at the address shown above. Ultimately, the public will also have an opportunity to offer comment in the public hearing before the Board of Supervisors.

6. Anticipated Timetable:

To be announced in the Notice of Proposed Rulemaking.

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

[M15-213]

COMBINED
NOTICE OF PROPOSED RULEMAKING
PURSUANT TO A.R.S. §49-112 AND §49-471.01 *et seq.*
AND
NOTICE OF ORAL PROCEEDING
PURSUANT TO A.R.S. 49-471.06

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposes that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The proposed rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These proposed general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions for the aforementioned land use categories. In addition the proposed rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The proposed amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the proposed corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this proposal may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, AZ, 85132, 520-866-6929,

scott.dibiase@pinalcountyaz.gov. To the extent possible, the District will also post information on the County's website, *pinalcountyaz.gov*, under the "air quality" link.

D. The rule making process will consist of an initial administrative rule development process, including this notice, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee. The date and location for the oral proceeding are set forth below. Written comments are due prior to the close of the comment period, which shall be the close-of-business on the day of the oral proceeding. The final step in the rule adoption process will be a hearing before the Board of Supervisors. The Board of Supervisors hearing will be separately scheduled and noticed in accord with A.R.S. §49-479, and, where applicable, the requirements of 40 C.F.R. §51.102.

E. The proposed revisions include the following:

1. §1-1-105 – Proposed addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Proposed amendment of Chapter 4, Article 1, §010,
   - Proposed amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Proposed removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.
3. Proposed addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:
   - Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
   - Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
   - Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
   - Dust generating operations (i.e. construction).
   - Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
4. Proposed addition of Chapter 4, Article 1, §020 (Definitions),
   - Sixteen definitions directly related to these rules.
5. Proposed addition of Chapter 4, Article 1, §030 (Standards)
   - Subsection 1 – General requirements
     - A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.
     - B. The owner and/or operator shall implement applicable control measures.
     - C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.
     - D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.
   - Subsection 2 – Open areas/vacant lots
     - A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
     - B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
     - C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.

D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.
E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.
F. Compliance determination.

• Subsection 3- Unpaved lots

A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.

• Subsection 4 – Unpaved roads

A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
B. Control measures are considered effectively implemented when:
i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
i. Done on unpaved roads previously untreated, and
ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.

• Subsection 5 – Paved public roadway

A. Trackout cleanup provisions for trackout that extends 50 feet or more.
i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
iii. Trackout cleanup extension provision
B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Proposed addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Proposed addition of Chapter 4, Article 1, §050 (Records retention)

Two year records retention requirement.

8. Proposed addition of Chapter 4, Article 1, §060 (Violations)

Violation provisions for these rules.

Violation exemptions include:

i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.

ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

Open areas/Vacant lots

There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the proposed general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the proposed 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the proposed 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The proposed rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to the surface area disturbed prior to, during and after the weed abatement. The proposed rules include additional trackout requirements associated with weed abatement activities. All of these new proposed restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the proposed general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold proposed (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the proposed rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection 4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road

is $100,000 per mile. Assuming the 15 miles per year requirement in 4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the proposed rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The proposed rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The proposed changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these proposed changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the proposed rule or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the proposed rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1730, August 28, 2015.

L. Date, time and location of oral proceeding:

1) Oral Proceeding
Date: September 28, 2015
Time: 10 a.m.
Location: 31 N. Pinal St., Florence, AZ
Building F, Ocotillo room

Nature of meeting: Oral proceeding before the Control Officer or his designee in accord with A.R.S. §49-471.06(C) to consider public comments upon any or all of this proposal.

2. The full text of the proposed changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, ##/##/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)

h. Reserved.
i. Article 9, limited to:
i. §4-9-320 (As amended 6/3/09)
ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
a.§111 of the Clean Air Act; or
b.Title IV of the 1990 amendments to the Clean Air Act; or
c.Title VI of the 1990 amendments to the Clean Air Act; or
d.Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:
1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*

21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~
WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C. , Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control FUGITIVE DUST from OPEN AREAS/VACANT LOTS, UNPAVED ROADS, UNPAVED LOTS and PAVED PUBLIC ROADWAYS by requiring measures to prevent, reduce or mitigate FUGITIVE DUST emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to Emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the OWNER AND/OR OPERATOR, including acts of God. Activities by an OWNER AND/OR OPERATOR to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to Normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to DUST GENERATING OPERATIONS subject to the standards and/or requirements described in Chapter 4, Article 10.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of FUGITIVE DUST in order to comply with applicable standards.

3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, deSTABILIZED, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing FUGITIVE DUST emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the OWNER AND/OR OPERATOR, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, FUGITIVE DUST does not include particulate matter emitted directly from the exhaust of MOTOR VEHICLEs and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform MOTOR VEHICLE Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
    a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
    b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
    c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.

12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously DISTURBED SURFACE AREA which, through the application of CONTROL MEASURES, shows visual or other evidence of surface crusting and is resistant to wind-driven FUGITIVE DUST.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of MOTOR VEHICLEs, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing MOTOR VEHICLEs and equipment. An UNPAVED LOT includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.
16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not PAVED. UNPAVED ROADs are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an UNPAVED ROAD is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by MOTOR VEHICLES.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

    A. The OWNER AND/OR OPERATOR of OPEN AREAS/VACANT LOTS, UNPAVED LOTS, UNPAVED ROADS and PAVED PUBLIC ROADWAYS shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.
    B. The OWNER AND/OR OPERATOR shall implement applicable CONTROL MEASURES.
    C. CONTROL MEASURES shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.
    D. Failure to implement CONTROL MEASURES as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The OWNER AND/OR OPERATOR of OPEN AREAS/ VACANT LOTS shall not cause, suffer, allow, or permit FUGITIVE DUST emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test

method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in OPEN AREAS/VACANT LOTS, an OWNER AND/OR OPERATOR shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective CONTROL MEASURES to effectively prevent access to the OPEN AREAS/VACANT LOTS.

C. OWNERS AND/OR OPERATORS of OPEN AREAS/VACANT LOTS 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more DISTURBED SURFACE AREA shall implement at least one CONTROL MEASURE described below on the DISTURBED SURFACE AREA in order to stabilize:

   i. Apply and maintain water or dust suppressants; or
   ii. Establish vegetation; or
   iii. Install and maintain pavement; or
   iv. Apply and maintain gravel uniformly; or
   v. Apply and maintain chemical/organic stabilizers/suppressants; or
   vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For OPEN AREAS/VACANT LOTS 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more DISTURBED SURFACE AREA, within 30 calendar days following the initial discovery of the DISTURBED SURFACE AREA on the OPEN AREAS/VACANT LOTS, the OWNER AND/OR OPERATOR shall sign up to receive the PINAL COUNTY DUST CONTROL FORECAST. The OWNER AND/OR OPRATOR shall ensure the OPEN AREAS/VACANT LOTS is STABILIZED the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the PINAL COUNTY DUST CONTROL FORECAST.

E. No person shall remove vegetation from any OPEN AREAS/VACANT LOTS by blading, disking, plowing under or any other means without implementing all of the following CONTROL MEASURES to prevent or minimize FUGITIVE DUST.
   i. Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material TRACKOUT onto paved surfaces and access points adjoining paved surfaces through one of the CONTROL MEASURES in 4-1-030.5.A.i.
   iii. Apply a DUST SUPPRESSANT (s), gravel, compaction or an alternative CONTROL MEASURE immediately following weed abatement to the entire DISTURBED SURFACE AREA such that the surface is STABILIZED.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or
   ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or
   iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or
   iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or
   v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The OWNER AND/OR OPERATOR of an UNPAVED LOT greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the CONTROL MEASURES described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The OWNER AND/OR OPERATOR of an UNPAVED LOT shall not cause or allow visible FUGITIVE DUST emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the OWNER AND/OR OPERATOR shall not allow the silt content to exceed 8%;

ii. **CONTROL MEASURES**:

a. Pave; or
b. Apply DUST SUPPRESSANT in sufficient quantity and frequency to maintain a STABILIZED surface; or
c. Apply and maintain surface gravel uniformly such that the surface is STABILIZED; or
d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. CONTROL MEASURE(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the UNPAVED LOT meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The OWNER AND/OR OPERATOR of UNPAVED ROADS with average daily trips (ADT) greater than 150 (A traffic count shall measure MOTOR VEHICLE traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. MOTOR VEHICLE traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the CONTROL MEASURES described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The OWNER AND/OR OPERATOR of UNPAVED ROADS shall not cause or allow visible FUGITIVE DUST emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the OWNER AND/OR OPERATOR shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES**:

a. Pave; or
b. Apply and maintain DUST SUPPRESANTS other than water; or
c. Uniformly apply and maintain surface gravel

B. CONTROL MEASURE(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the CONTROL MEASURES described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of UNPAVED ROADS having ADT of 150 or more.

a. When the CONTROL MEASURE is application and maintenance of DUST SUPPRESANTS other than water, the application and maintenance of the DUST SUPPRESANTS shall only be counted towards the 15 mile threshold when:

1. Done on UNPAVED ROADS previously untreated, and
2. Application and maintenance of DUST SUPPRESANTS on UNPAVED ROADS previously treated continues annually until the UNPAVED ROAD is paved.

ii. For year 2019 and beyond, CONTROL MEASURES applied on UNPAVED ROADS with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:
In year one, City or County "A" paves 10 miles of UNPAVED ROADS with ADT of 100.
10 * 0.514 = 5.14 miles of 150 ADT equivalent UNPAVED ROADS.

5. PAVED PUBLIC ROADWAY

A. Clean up of TRACKOUT, Erosion-Caused Deposition of Bulk Materials on PAVED PUBLIC ROADWAY: the OWNER AND/OR OPERATOR of the property from which the TRACKOUT or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the PAVED PUBLIC ROADWAY shall:

i. Within 24 hours of discovery, remove the mud/dirt from PAVED PUBLIC ROADWAY with one of the following CONTROL MEASURES. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the PAVED PUBLIC ROADWAY)

i. Manually sweeping and picking up; or
ii. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
iii. Operating a PM10 efficient street sweeper; or
iv. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program

ii. During removal of mud/dirt, do so in a manner that does not cause another source of FUGITIVE DUST.

iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The OWNER AND/OR OPERATOR of any existing PAVED PUBLIC ROADWAYs shall take the following actions prior to, during and after work on UNPAVED ROAD shoulders:

i. Apply a DUST SUPPRESSANT(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a STABILIZED surface.

ii. Prevent TRACKOUT by using one of the CONTROL MEASURES listed in 4-1-030.5.A.1.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of CONTROL MEASURE application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or CONTROL MEASURE, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing PAVED PUBLIC ROADWAY and UNPAVED ROADS shall take the following actions:

A. By January 30 of each year provide the DISTRICT with a list of all UNPAVED ROADS under its jurisdiction, including data on length of, and ADT (if available) on, each UNPAVED ROAD segment.

B. By January 30 of each year, submit to the District a list of UNPAVED ROADS which were paved during the previous year including the total number of UNPAVED ROADS miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by 4-1-040 (Recordkeeping) and 4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:

i. Wind conditions that cause FUGITIVE DUST to exceed the opacity requirements if applicable CONTROL MEASURES are implemented, applied and maintained, and all dust contributing DISTURBED SURFACE AREAs are STABILIZED.

ii. EMERGENCY maintenance of flood control channels and water retention basins if at least 1 applicable CONTROL MEASURE is applied, and maintained.

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
wide open opportunity

Fugitive Dust Stakeholder Meeting
Tuesday, September 1, 2015
10 AM
Pinal County Ocotillo Room
31 N. Pinal Street, Florence, AZ.

1. Welcome

2. Introductions

3. SIP Background/Status

4. Proposed Rule Review

5. Discussion

PINAL • COUNTY

Wide open opportunity

PINAL COUNTY AIR QUALITY CONTROL DISTRICT
31 N. PINAL ST., FLORENCE, ARIZONA 85132

DRAFT GENERAL FUGITIVE DUST RULE STAKEHOLDER MEETING
SEPTEMBER 1, 2015 10 A.M. OCOTILLO ROOM, BUILDING F

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Ryan Templeton	ADEQ	1110 W Washington Phoenix	602-771-4230	rct@azdeq.gov
Marina Majic	" "	" "	602-771-4858	mm23@azdeq.gov
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Pinal County PM_{10} Nonattainment Area SIP Overview

Pinal County Stakeholder Meeting

31 N Pinal St, Florence, AZ

9/1/2015

Introduction

The Pinal County PM_{10} Nonattainment Area was redesignated as nonattainment for the 1987 24-hour PM_{10} National Ambient Air Quality Standard (NAAQS) by the U.S. Environmental Protection Agency (EPA) on July 2, 2012. Since this time, the Arizona Department of Environmental Quality (ADEQ) has been gathering and processing information to create an emission inventory for the designated nonattainment area. The resulting nonattainment area emission inventory informed control measure determination for emitting sources including, but not limited to, agriculture, construction, roads, unpaved lots, and vacant lots.

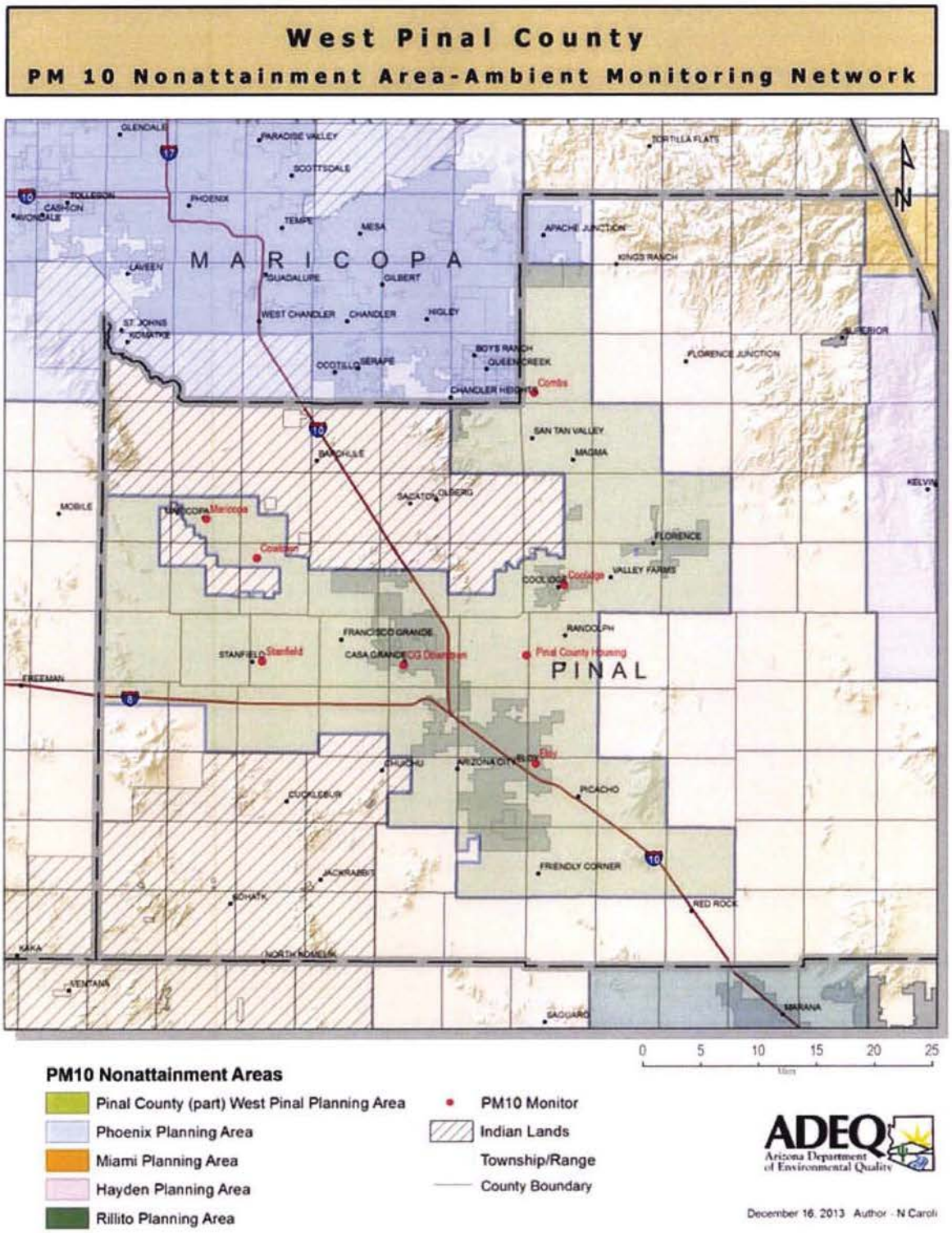
The information included in this document provides insight into the technical results of the emission inventory and control measure effectiveness determination. ADEQ is required to model attainment of the NAAQS by 2018 relying on controls codified into rule. To meet this requirement, ADEQ relied upon those controls included in the Arizona Administrative Code R18-2-610.03 (Commercial crop farm controls), Arizona Administrative Code R18-2-611.03(E) (Commercial beef feedlot controls), and Arizona Administrative Code R18-2-612.01 (Irrigation district controls). These controls were modeled to produce the emission reductions required to meet attainment for seven different design day scenarios (three stagnation and four high-wind scenarios). These controls resulted in total nonattainment area, annual PM_{10} emission reductions of 22,424.4 tons/year.

EPA further requires contingency controls be available to meet annual emission reductions equivalent to one year of reasonable further progress (RFP) for the nonattainment area. As the nonattainment area will need to meet attainment in 2018 (i.e., over the next three years, 2016-2018), these contingency controls must exceed 7,474.8 tons (7,474.8 tons = 22,424.4 tons / 3 years). To meet the contingency requirement, ADEQ is relying on Arizona Administrative Code R18-2-611.03 (Commercial dairy controls) as well as the proposed rule changes included in PCAQCD Code of Regulations §4-3-160, -170, -180, and -190 (Construction controls) and PCAQCD Code of Regulations §4-1-010, -015, -020, -030, -040, -045, -050, and -060 (General fugitive dust controls).

Finally, ADEQ is required to calculate a mobile vehicle emissions budget (MVEB) for the nonattainment area. This MVEB is derived from the nonattainment area, annual attainment emission inventory and was calculated by ADEQ as 28,542.5 tons/year. Analysis performed by ADEQ indicates that this MVEB will be adequate to meet the transportation conformity needs of the County for decades to come, assuming compliance with the proposed rule change included in PCAQCD Code of Regulations §4-1-030.4. (General fugitive dust rule, unpaved road controls).

Nonattainment Area

The following figure shows the location of air quality monitors and municipality boundaries within and surrounding the Pinal County PM_{10} nonattainment area.



Emission Inventory Sectors

Two primary scenarios produce PM_{10} emission in the Pinal County nonattainment area: 1) windblown dust emissions during high winds and 2) mechanical entrainment of dust into the atmosphere from human activities. The magnitude of windblown dust emissions depend on land stability and wind speed. The magnitude of activity related emissions are dependent on the degree to which the activity entrains PM_{10} and the duration of the activity. Table 1 and Table 2 present the source categories investigated for these two primary emission production scenarios.

Table 1 Land Use Categories for Windblown Emissions

Developed Urban Lands
Developed Rural Lands (low density residential)
Paved Roads
Unpaved Roads
Cleared Areas
Residential Construction
Dairies
CAFOs
Desert Shrubland
Agriculture
Commercial Construction
Other
Site Development

Table 2 Activity-Based Emission Source Categories

Ag Fields (Harvesting & Tilling)
CAFOs
Dairies
Paved Road
Unpaved Road (Public, Private, Agricultural, and Trails)
Nonroad
Railroad
Construction (Residential, Commercial, Road, and Site Development)
Permitted Sources
Fuel Combustion (Residential)
Fires (Agricultural, Wildfires, and Prescribed Fires)
Open Burning (Residential, Commercial, and Land Clearing)
Unpaved Parking

Pinal County PM_{10} Nonattainment Area Controls

Table 3 and Table 4 present the rules, either codified or proposed, to be implemented in Pinal County to reach attainment and meet contingency requirements and their associated annual emissions.

Table 3 Summary of Attainment Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-610.03	Commercial crop farms (including tillage, ground operation and harvest, commercial farm roads, and noncropland)	January 1, 2016	21,420.6
Arizona Administrative Code, R18-2-611.03(E)	Commercial beef cattle feedlot	January 1, 2016	281.3
Arizona Administrative Code, R18-2-612.01	Irrigation Districts	January 1, 2016	722.3
Total			22,424.2

Table 4 Summary of Contingency Measure Reductions

Rule	Controlled Dust Sources	Implementation date	Reductions in 2018 (TPY)
Arizona Administrative Code, R18-2-611.03	Commercial dairy operations	January 1, 2016	101.2
PCAQCD Code of Regulations, §4-3-160, -170, -180, and -190	Permitted construction projects	January 1, 2016	4,679.4
PCAQCD Code of Regulations, §4-1-010, -015, -020, -030, -040, -045, -050, and -060	Several prescribed area sources of fugitive dust, including vacant lots and other open areas, roads, and other traffic areas.	Effective January 1, 2016, with some controls being implemented progressively	2,962.3
Total			7,742.9

Design Days (Attainment Demonstration)

With the implementation of the controls listed in Table 3, ADEQ is able to model attainment for the seven design days in 2018. Observed (2008) and projected modeled impacts (2018 and 2018 attainment) are presented in Table 5.

Table 5: Design Day Concentrations: 2008, Projected 2018, and Projected Controlled 2018

Year	Design day		Design value (µg/m³)	
2008	Stagnation	Cowtown	244.5	Monitor observations
		Pinal County Housing	178.0	
		Stanfield	162.0	
	High-Wind	Cowtown	168.3	
		Maricopa	159.4	
		Pinal County Housing	264.9	
		Stanfield	178.6	
2018	Stagnation	Cowtown	188.2	Modeled projections
		Pinal County Housing	179.5	
		Stanfield	197.6	
	High-Wind	Cowtown	165.2	
		Maricopa	139.8	
		Pinal County Housing	263.2	
		Stanfield	186.8	
2018 - Attainment	Stagnation	Cowtown[1]	152.3	Modeled projections
		Pinal County Housing[1]	154.8	
		Stanfield[1]	154.7	
	High-Wind	Cowtown	122.1	
		Maricopa	124.2	
		Pinal County Housing	135.7	
		Stanfield	112.6	

[1] Design values are rounded to two significant figures for determination of NAAQS attainment. As such, any value < 155 µg/m³ is rounded down to 150 µg/m³ and will attain the NAAQS.

Annual Emission Reductions

Sector		Base 2008 Emissions Inventory (TPY)	Base 2018 Emissions Inventory (TPY)	Attainment 2018 Emissions Inventory (TPY)	Post-contingency 2018 Emissions Inventory (TPY)
Windblown dust	Developed Urban Lands	200.7	248.1	248.1	192.9
	Developed Rural Lands (low density residential)	1,959.7	1,959.7	1,959.7	1,895.6
	Unpaved Roads (including Ag roads)	4,688.6	4,657.0	3,809.1	3,800.0
	Cleared Areas	398.1	457.0	457.0	325.7
	Residential Construction	1,302.4	837.5	837.5	430.5
	Dairies	449.6	449.6	449.6	384.2
	CAFOs	273.7	155.2	125.3	125.3
	Desert Shrubland	38,276.7	38,276.7	38,276.7	36,709.1
	Agriculture	19,510.1	19,510.1	7,122.0	7,122.0
	Commercial Construction	686.4	441.4	441.4	216.3
	Other	4,243.9	4,243.9	4,243.9	4,239.5
	Site Development	858.7	552.2	552.2	278.9
	Subtotal	72,848.6	71,788.4	58,522.5	55,720.0
Activity-based emissions	Ag Fields - Harvesting	312.9	312.9	207.1	207.1
	Ag Fields - Tilling	2,540.3	2,540.3	1,658.0	1,658.0
	CAFOs	2,614.3	1,620.6	1,369.2	1,369.2
	Paved Road	1,180.7	1,408.0	1,408.0	1,402.3
	Unpaved Road	43,656.2	45,688.6	37,769.6	36,716.9
	Fuel Combustion	28.3	34.8	34.8	34.8
	Fires	19.9	22.2	22.2	22.2
	Open Burning	13.6	16.7	16.7	16.7
	Nonroad	121.3	155.6	155.6	155.6
	Railroad	85.9	45.5	45.5	45.5
	Construction	12,955.3	8,471.9	8,471.9	4,702.9
	Dairy	186.6	184.0	184.0	148.2
	Permitted Sources	781.3	781.3	781.3	781.3
	Unpaved Parking	251.5	251.5	251.5	172.5
	Subtotal	64,748.1	61,533.9	52,375.4	47,433.2
Total		137,596.7	133,322.3	110,897.9	103,153.2

Motor Vehicle Emissions Budget

The MVEB presented in Table 6 considers the combined contributions of motor vehicles traveling roads within the nonattainment area, as well as the emissions from construction projects on those roads. Emissions from non-road vehicles are not included in the budget, nor are emissions produced by wind traveling over the roads and construction sites. Emissions from certain commercial roads, which are expected to remain fairly constant from one year to the next, are also omitted. The budget is established for annual emissions totals, and anticipates various changes in traffic, fleet characteristics, road work, and new rules and regulations up through calendar year 2018.

Table 6: Annual MVEB by Source Sector

Source	Tons of PM_{10}
Exhaust, tire-, & brake-wear (paved and unpaved roads)	173.7
Reentrained unpaved road dust (including public and private roads, excluding trials and agricultural roads)	27,016.7
Reentrained paved road dust	1,211.1
Road construction/maintenance	140.9
Total	28,542.5

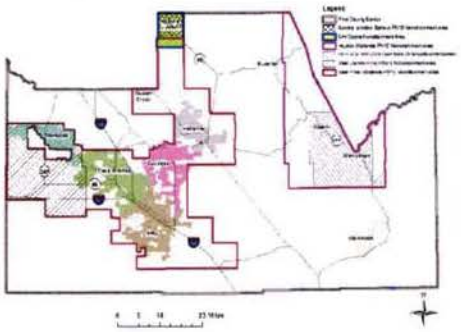
Pinal County
Draft General Fugitive Dust Rule

September 1, 2015

General Applicability

- Source categories
  - Open areas/vacant lots
  - Public unpaved roads
  - Unpaved lots
  - Paved public roadways
- Applicable in the West Pinal PM10 Nonattainment area

Pinal County Nonattainment Areas



Exemptions

- Vehicle test and development facilities
- Emergency response
- Normal farm cultural practices
- Construction (i.e. Dust Generating Operations)
- Establishment of initial landscapes without use of mechanized equipment and playing or maintaining a field used for non-motorized sports

General Requirements

- The owner and/or operator (Ow/Op) of source categories are subject to standards and/or requirements of the rule
- The Ow/Op shall implement applicable control measures
- Control measures implemented in order to meet
  - visible emissions requirements and stabilization requirements

Open Areas/Vacant Lots

- The Ow/Op shouldn't cause, allow or permit fugitive dust emissions on the property to exceed 20% opacity
- If trespass occurs the Ow/Op shall install one of the following:
  - No trespassing signs
  - Physical barriers

Open Areas/Vacant Lots (Cont.)

- The Ow/Op of open areas/vacant lots 1 acre or larger that has 0.5 acres or more of disturbed surface area shall implement at least one control measure (see below) on disturbed surface area in order to stabilize.
  - Apply and maintain water or dust suppressants; or
  - Establish vegetation; or
  - Install and maintain pavement; or
  - Apply and maintain gravel uniformly; or
  - Apply and maintain chemical/organic stabilizers/suppressants; or
  - An alternative control measure approved by the Control Officer (CO) and EPA

Open Areas/Vacant Lots (Cont.)

- Within 30 days of initial discovery of the disturbed surface area, the Ow/Op shall sign up to receive the Pinal County Dust Control Forecast. The Ow/Op shall ensure their open area/vacant lots are stabilized the day leading up and during a day forecasted to be high risk.

Open Areas/Vacant Lots (Cont.)

- Removal of vegetation by blading, disking, plowing under shouldn't be done without implementing all of the following control measures:
  - Apply dust suppressants to the disturbed surface area
  - Prevent or eliminate trackout
  - Apply a dust suppressant(s), gravel, compaction or an alternative control measures immediately following weed abatement to the area worked

Open Areas/Vacant Lots (Cont.)

- Compliance with stabilization requirements, one of the following:
  - Observation of a visible crust (drop ball test); or
  - Threshold Friction Velocity (TFV) of 100 cm/second or higher; or
  - Flat vegetation => 50 %; or
  - Standing vegetation => 30%; or
  - Standing vegetation => 10% where TFV => 43 cm/s

Unpaved Lots

- Applicable to unpaved lots >5,000 ft^2
- Not to exceed 20% opacity
- Not to allow silt loading => 0.33 oz/ ft^2. If silt loading => 0.33 oz/ ft^2 then not allowed to have silt content exceed 8%.
- Use one of the control measures on any surface area(s) where vehicles enter and park

Unpaved Lots (Cont.)

- Control measures:
  - Pave; or
  - Apply and maintain chemical/organic stabilizers; or
  - Apply and maintain surface gravel; or
  - Apply and maintain an alternative control measure (approved by CO and EPA)
- Compliance determined when the lot is:
  - Below the 20% opacity and silt loading is less than 0.33 oz/ft^2 (or silt content is less than 8%)

Public Unpaved Roads

- Public unpaved roads with 150+ ADT
  - Visible emissions/stabilization requirements
    - 20% opacity threshold
    - Silt loading less than 0.33 oz/ft^2 (or less than 6% silt content)
  - Control measures:
    - Pave; or
    - Apply and maintain dust suppressants other than H_2O; or
    - Uniformly apply and maintain gravel
  - Control measures compliance determined when:
    - One of the control measures is annually implemented on 15 miles per year of unpaved roads having ADT 150+
      - When the control measure is a dust suppressant (other than water), the application & maintenance of the suppressant shall only be counted towards the 15 mile threshold when,
        - Done on unpaved roads previously untreated and
        - Application and maintenance continues on that road annually until the road is paved
      - For year 2019 and beyond, roads with ADT 150 and lower can be used for compliance with the 15 miles per year through an equivalency conversion

Equivalency Conversion

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-41	0.121
42-101	0.314
102-149	0.511
150+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of UNPAVED ROADS with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent UNPAVED ROADS.

Paved Public Roadway

- Trackout
  - 50+ foot threshold
  - Within 24 hours of discovery remove trackout
    - During removal do in a manner that doesn't cause another source of fugitive dust
  - Extension possible (after 72 hours)
    - Unsafe travel conditions would result from restricting traffic to clean up
    - Weekend or holiday
    - Have to notify and get approval from CO

Paved Public Roadway (Cont.)

- Work on unpaved shoulders:
  - The Ow/Op of paved public roadway shall apply dust suppressants to the surface area subject to the disturbance prior to, during and after the work.

Recordkeeping

- Anyone subject to this rule is required to compile and retain records in order to provide evidence of control measure application (i.e. receipts and/or purchase records).
- Records should include
  - Control measure used
  - Extend of coverage
  - Date applied
- Upon request by CO, records should be submitted within 48 hrs, excluding weekends
- If CO onsite, records should be provided without delay
- Record retention – at least 2 years

Reporting Requirements

- By January 30th of each year, each city, county or state agency shall provide to the district a list of all unpaved roads under its respective jurisdiction, including length and ADT (if available) of each unpaved road segment.
- By January 30th of each year, provide a list of unpaved roads which were paved during the previous year including total number of unpaved roads miles, ADTs (if available) and their respective segments.

Violations

- Failure to comply constitutes a violation subject to penalty (A.R.S. 49, ch. 3, article 3; 49-471, etc.)
- Violation exemptions:
  - Opacity requirements aren't applicable when wind conditions cause opacity >20% if control measures are implemented/applied/maintained and all disturbed surface areas are stabilized
  - Emergency maintenance of flood control channels & water retention basins if at least 1 control measure is applied/maintained

Questions/Comments?

PRINTERS INVOICE PUBLISHERS

200 West Second Street
Casa Grande, Arizona 85122

Florence REMINDER & BLADE-TRIBUNE

Ruth A. Kramer, President

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Fax (520) 836-0343

PINAL COUNTY AIR QUALITY CONTROL DIST.
NELDA NUNEZ
PO BOX 987
FLORENCE, AZ 85132

SEPTEMBER 17, 2015
OUR ORDER NO. 33965
CUSTOMER ORDER NO. 232935

EQUIPMENT TO DO FINE PRINTING - CRAFTSMEN WHO DO IT

DESCRIPTION	PRICE
PUBLIC NOTICE PUBLICATION:	
PUBLIC NOTICE / PROPOSED RULEMAKING	
PINAL COUNTY AIR QUALITY SEP 24 2015 RECEIVED	
PUBLISHED ONE (1) TIME 8.5 INCHES PER PUBLICATION	
8.5 INCHES @ $5.48 PER INCH	$ 46.58
TAX 2%	$ 0.93
TOTAL	$ 47.51

BJG

STATE OF ARIZONA }

COUNTY OF PINAL

Public Notice
Proposed Rulemaking
Board of Supervisors Public Hearing

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. The ultimate purpose of this rulemaking proposal will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

Ongoing violations of the PM10 (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal PM10 Nonattainment Area). A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification (i.e. emissions inventory) and solutions (i.e. rules) to the problem. The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM10 emissions inventory for the West Pinal PM10 Nonattainment Area. The top three emissions sources in the base year PM10 emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This rulemaking proposal addresses the general fugitive dust emissions associated with windblown dust, unpaved and paved roads.

Given the obligatory nature of this rulemaking proposal, it has followed the rulemaking process defined in A.R.S. §§49-112.D and 49-471. The combined notice of proposed rulemaking and oral proceeding was published in the Arizona Administrative Register (AAR) on August 28, 2015 (found online at www.azsos.gov) which started the official 30-day public comment period (which ends at the close of business on September 28, 2015). The Oral Proceeding will take place at 10 a.m. on September 28, 2015 in the Ocotillo room of Building F of the county complex located at 31 N. Pinal St., Florence, AZ.). The oral proceeding provides a formal opportunity for the public to make comments on the rulemaking proposal to the Pinal County Air Quality Control Officer. The rulemaking proposal along with a summary of any comments received will be submitted to the Board of Supervisors for consideration and possible adoption. The date, time and location of the Board of Supervisors public hearing-of-adoption is October 28, 2015, 9:30 a.m. at the Pinal County Administrative Complex, Board of Supervisors Hearing Room located at 135 N. Pinal Street, Florence, AZ. 85132.

The agenda for the Board of Supervisors meeting on October 28, 2015 can be found online at http://pinalcountyaz.gov/bos/Pages/AngendaMinutes.aspx.

No. of publications: 1; date of publication: Sept. 17, 2015.

Affidavit of Publication

RUTH A. KRAMER first being duly sworn deposes and says: That he/she is a native born citizen of the United States of America, over 21 years of age, that I am an agent and/or publisher of the the Florence Reminder & Blade-Tribune, a weekly newspaper published at Florence, Pinal County, Arizona, on Thursday of each week; that a notice, a full, true and complete printed copy of which is hereunto attached, was printed in the regular edition of said newspaper, and not in a supplement thereto, for **ONE** consecutive issues. The first publication thereof having been on the **17TH**

day of **SEPTEMBER** A.D., **2015**

Second publication _____

Third publication _____

Fourth publication _____

Fifth publication _____

Sixth publication _____

FLORENCE REMINDER & BLADE-TRIBUNE

By Ruth A Kramer
agent and/or publisher of the Florence Reminder & Blade-Tribune

Sworn to before me this 21st
day of September A.D., 2015
Catherine Ortiz
Notary Public in and for the County
of Pinal, State of Arizona

Official Seal
NOTARY PUBLIC
State of Arizona
County of Pinal
CATHERINE ORTIZ
My Comm. Expires 7-13-2018

PRINTERS

INVOICE

PUBLISHERS

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Casa Grande **Dispatch**

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NELDA NUNEZ
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SEPTEMBER 17, 2015
OUR ORDER NO. 33965
CUSTOMER ORDER NO. 232942

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PINAL COUNTY'S LEADING NEWSPAPER

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17TH day of SEPTEMBER A.D., 2015

Second publication _____

Third publication _____

Fourth publication _____

Fifth publication _____

Sixth publication _____

CASA GRANDE DISPATCH

By Ruth A. Kramer
agent and/or publisher of the Casa Grande Dispatch

Sworn to before me this 21st
day of September A.D., 2015
Catherine Ortiz
Notary Public in and for the County
of Pinal, State of Arizona

Official Seal
NOTARY PUBLIC
State of Arizona
County of Pinal
CATHERINE ORTIZ
My Comm. Expires 7-13-2018

PINAL COUNTY DEPARTMENT OF DEVELOPMENT SERVICES
AIR QUALITY CONTROL DISTRICT
POST OFFICE BOX 987, FLORENCE, ARIZONA 85232

POSTING CERTIFICATION OF NOTICE

The undersigned hereby certifies that a copy of the attached notice was duly posted at:

(1) Pinal County Administration 1 – Bldg A Lobby on September 16th

(2) Pinal County Treasurer's Office – Bldg E on September 16th

(3) Pinal County Admin 3 – Bldg F Lobby on September 16th

(4) Justice Court – 400 S Central Ave on September 16th

(5) Pinal Co Clerk of the Court – 971 Jason Lopez Ci on September 16th

in accordance with the statement filed by the PINAL COUNTY AIR QUALITY CONTROL ADVISORY COUNCIL with the Clerk of the Pinal County Board of Supervisors.

Dated this 16th day of September, 2015

Tanya R Palmos

Tanya R. Palmos
Secretary
Pinal County Air Quality Control District

Michael Sundblom
Air Quality Director

PINAL • COUNTY
wide open opportunity

Greg Stanley
County Manager

Public Notice

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31 North Pinal Street, Building F, PO Box 987 Florence, AZ 85232 T 520-866-6929 FREE 888-431-1311 F 520-866-6967 www.pinalcountyaz.gov

Scott DiBiase

From: Nelda Nunez
Sent: Friday, September 11, 2015 10:12 AM
To: 'Amanda McGennis'; 'Amy Courson'; Andrew Steckel (steckel.andrew@epa.gov); 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Bryant Powell (bpowell@ajcity.net)'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; Heidi Haggerty; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; 'hkrauss@ci.eloy.az.us'; Irene J. Higgs (ihiggs@scmpo.org); 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson (jimt@casagrandeaz.gov)'; 'jmehta@marana.com'; 'Jo Crumbaker (jcrumbaker@mail.maricopa.gov)'; 'Joe Sigg (joesigg@azfb.org)'; 'John Insalaco (jmason@ajcity.net)'; 'John Kross (john.kross@queencreek.org)'; 'Jon Post (jpost@marana.com)'; 'Joonwon Joo (jjoo@azdot.gov)'; 'Joseph Nagy - City of Eloy (jnagy@ci.eloy.az.us)'; 'Juan Ponce (publicworks@townofmammoth.com)'; 'Julia Gusse (julia.gusse@maricopa-az.gov)'; 'Karl Montoya (kmontoya@casagrandeaz.gov)'; 'Kazi Haque (kazi.haque@maricopa-az.gov)'; 'Kevin Boesch (kboesch@ladaz.com)'; 'Kevin Louis (klouis@casagrandeaz.gov)'; 'Kevin Wanttaja - Salrt River Project (kevin.wantaja@srpnet.com)'; 'khall@cagaz.org'; 'Larry Hawke - Pima County Department of Environmental Quality (larry.hawke@pima.gov)'; 'Larry Kirch (lkirch@ajcity.net)'; 'ldunagan@ci.eloy.az.us'; 'Leroy Williams (williams@gilanet.net)'; 'lfitzgibbons@casagrandeaz.gov'; 'Lindy Bauer (lbauer@mag.maricopa.gov)'; 'Lisa Garcia (lisa.garcia@florenceaz.gov)'; 'Louis Manuel Jr (lmanuel@ak-chin.nsn.us)'; 'Maeve Clancy (clancy.maeve@epa.gov)'; 'Margaret Gaston (townmanager@superior-arizona.com)'; Marina Mejia; 'mark.eckhoff@florenceaz.gov'; 'Martin Scribner'; 'Marvin Brown (marvin.brown@maricopa-az.gov)'; 'Mary Kortsen (mkortsen@casagrandeaz.gov)'; 'massey.eric@azdeq.gov'; 'Matt Herman (mherman@casagrandeaz.gov)'; 'Michael Curtis (mcurtis401@aol.com)'; 'Michael Jackson (cactus2yelap@hotmail.com)'; 'Michael Wesley (mwesley@khov.com)'; 'Morgan Holmes (mholmes@cgsuslaw.com)'; 'mrichardson@asarco.com'; 'nancy.nesky@aps.com'; 'Nick Simonetta (nick@pivotalpolicyconsulting.com)'; 'Norman Hinz (nhinz@pinalfeeding.com)'; 'Ole Solberg (ole@solbergengineering.com)'; 'Patrick Bray (pbray@arizonabeef.org)'; 'Patti Comerford (pcomerford@marana.com)'; 'Paul Jepson (paul.jepson@maricopa-az.gov)'; 'Peggy Chapados (peggy.chapados@maricopa-az.gov)'; Pete Rios; 'Phil McNeely (pmcneely@mail.maricopa.gov)'; 'Ralph Varela (rvarela@casagrandeaz.gov)'; 'Ramona Simpson (ramona.simpson@queencreek.org)'; 'Randy Schroeder (info@envalue.us)'; 'Richard Grimaldi (richard.grimaldi@pima.gov)';

To: 'Rick Lavis - Arizona Cotton Growers Association ()'; 'rios.gerardo@epamail.epa.gov'; 'rmiller@coolidgeaz.com'; 'Robert Boyle (mcclintockdairy@hotmail.com)'; 'Robert Flatley (bobf@coolidgeaz.com)'; 'Robert Goodhue (bob.goodhue@maricopa-az.gov)'; 'Rolf von Oppenfeld (rvo@testlaw.com)'; 'Roxanne Smith (roxannesmith@orbitelcom.com)'; 'Roxanne Ziegler (rziegler@marana.com)'; 'Rudy Mix (rudy.mix@gric.nsn.us)'; 'Russell Bowers (rusty@azrockproducts.org)'; 'Ryan Benavides (rbenavides@marana.com)'; 'Ryan Mahoney (rmahoney@marana.com)'; 'sam_hosler@msn.com'; 'Sandie Smith (sandie@pinalpartnership.com)'; 'Sandy Bahr (sandy.bahr@sierraclub.org)'; 'sarah.walters@pima.gov'; 'Scott Weaver (scott.weaver@erm.com)'; 'Shane Kieso (skiesow@ajcity.net)'; 'Spencer Kamps (kampss@hbaca.org)'; 'Steve Cheslak (scheslak@marana.com)'; Steve Miller; 'Steve Murray (smurray@asarco.com)'; 'Steve Trussell (steve@azrockproducts.org)'; 'Steven Johnson - Gila River Indian Community (steven.johnson@gric.nsn.us)'; 'Susanna Struble (sstruble@coolidgeaz.com)'; 'thompson5155@msn.com'; 'tim.sturdavant@hexcel.com'; Todd House; 'tom.rankin@florenceaz.gov'; Travis Ashbaugh; 'Troy White (troy.white@queencreek.org)'; 'Ursula Nelson (ursula.nelson@pima.gov)'; 'Walter Ritcher (walter.ritcher@swgas.com)'; 'Wavalene Romero - Tohono O'odham Nation (wavalene.romero@tonation-nsn.gov)'; 'Wayne Costa (wayne.costa@florenceaz.gov)'; 'Wendy Crites (wmcrites@srpnet.com)'; 'William Sullivan (wsullivan@cgsuslaw.com)'; 'Yvonne Everlund (yes4change@yahoo.com)'

Cc: Michael Sundblom; Scott DiBiase

Subject: Pinal County Air Quality rulemakings - Public Notice Board of Supervisors Public Hearing October 28, 2015

Dear Stakeholder,

The rulemakings for the draft general fugitive dust and construction fugitive dust rules are ongoing. The rulemaking docket openings and combined notices of proposed rulemakings and oral proceedings were published in the Arizona Administrative Register (AAR) on August 28, 2015 (online at http://apps.azsos.gov/public_services/register/2015/35/28_county_notices.pdf). The Oral Proceedings for both rulemakings take place on September 28th, see below for details. Anyone that is interested in providing comments on the draft rules may do so by either emailing them to scott.dibiase@pinalcountyaz.gov or mailing them to Pinal County Air Quality, Attention: Scott DiBiase, 31 North Pinal St., Building F, P.O. Box 987, Florence, AZ. 85132 or providing written or oral comments at the respective oral proceeding on September 28th (see oral proceeding details below). The public comment period is ongoing and will close at the close of business on September 28th.

General fugitive dust oral proceeding – September 28, 2015, 10 a.m., 31 N. Pinal St., Building F, Ocotillo room.

Construction fugitive dust oral proceeding - September 28, 2015, 1 p.m., 31 N. Pinal St., Building F, Ocotillo room.

The last step in the rulemaking process is a public hearing with the Pinal County Board of Supervisors (BOS). The public notices (general fugitive dust & construction) for the Board of Supervisors public hearing on October 28, 2015 is attached. It is at the BOS public hearing where the BOS will be presented with the draft rules along with any comments received and will decide whether or not to adopt the proposed rules. The BOS public hearing is the final opportunity for the general public to make comments.

Please let me know if you have any questions and/or comments.

Sincerely,

Scott DiBiase
Pinal County Air Quality

Scott DiBiase

From: Scott DiBiase
Sent: Tuesday, September 15, 2015 7:52 AM
To: 'Amanda McGennis'; 'Amy Courson'; Andrew Steckel (steckel.andrew@epa.gov); 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Bryant Powell (bpowell@ajcity.net)'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; Heidi Haggerty; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; 'hkrauss@ci.eloy.az.us'; Irene J. Higgs (ihiggs@scmpo.org); 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson (jimt@casagrandeaz.gov)'; 'jmehta@marana.com'; 'Jo Crumbaker (jcrumbaker@mail.maricopa.gov)'; 'Joe Sigg (joesigg@azfb.org)'; 'John Insalaco (jmason@ajcity.net)'; 'John Kross (john.kross@queencreek.org)'; 'Jon Post (jpost@marana.com)'; 'Joonwon Joo (jjoo@azdot.gov)'; 'Joseph Nagy - City of Eloy (jnagy@ci.eloy.az.us)'; 'Juan Ponce (publicworks@townofmammoth.com)'; 'Julia Gusse (julia.gusse@maricopa-az.gov)'; 'Karl Montoya (kmontoya@casagrandeaz.gov)'; 'Kazi Haque (kazi.haque@maricopa-az.gov)'; 'Kevin Boesch (kboesch@ladaz.com)'; 'Kevin Louis (klouis@casagrandeaz.gov)'; 'Kevin Wanttaja - Salrt River Project (kevin.wantaja@srpnet.com)'; 'khall@cagaz.org'; 'Larry Hawke - Pima County Department of Environmental Quality (larry.hawke@pima.gov)'; 'Larry Kirch (lkirch@ajcity.net)'; 'ldunagan@ci.eloy.az.us'; 'Leroy Williams (williams@gilanet.net)'; 'lfitzgibbons@casagrandeaz.gov'; 'Lindy Bauer (lbauer@mag.maricopa.gov)'; 'Lisa Garcia (lisa.garcia@florenceaz.gov)'; 'Louis Manuel Jr (lmanuel@ak-chin.nsn.us)'; 'Maeve Clancy (clancy.maeve@epa.gov)'; 'Margaret Gaston (townmanager@superior-arizona.com)'; Marina Mejia; 'mark.eckhoff@florenceaz.gov'; 'Martin Scribner'; 'Marvin Brown (marvin.brown@maricopa-az.gov)'; 'Mary Kortsen (mkortsen@casagrandeaz.gov)'; 'massey.eric@azdeq.gov'; 'Matt Herman (mherman@casagrandeaz.gov)'; 'Michael Curtis (mcurtis401@aol.com)'; 'Michael Jackson (cactus2yelap@hotmail.com)'; 'Michael Wesley (mwesley@khov.com)'; 'Morgan Holmes (mholmes@cgsuslaw.com)'; 'mrichardson@asarco.com'; 'nancy.nesky@aps.com'; 'Nick Simonetta (nick@pivotalpolicyconsulting.com)'; 'Norman Hinz (nhinz@pinalfeeding.com)'; 'Ole Solberg (ole@solbergengineering.com)'; 'Patrick Bray (pbray@arizonabeef.org)'; 'Patti Comerford (pcomerford@marana.com)'; 'Paul Jepson (paul.jepson@maricopa-az.gov)'; 'Peggy Chapados (peggy.chapados@maricopa-az.gov)'; Pete Rios; 'Phil McNeely (pmcneely@mail.maricopa.gov)'; 'Ralph Varela (rvarela@casagrandeaz.gov)'; 'Ramona Simpson (ramona.simpson@queencreek.org)'; 'Randy Schroeder (info@envalue.us)'; 'Richard Grimaldi (richard.grimaldi@pima.gov)';

To: 'Rick Lavis - Arizona Cotton Growers Association ()'; 'rios.gerardo@epamail.epa.gov'; 'rmiller@coolidgeaz.com'; 'Robert Boyle (mcclintockdairy@hotmail.com)'; 'Robert Flatley (bobf@coolidgeaz.com)'; 'Robert Goodhue (bob.goodhue@maricopa-az.gov)'; 'Rolf von Oppenfeld (rvo@testlaw.com)'; 'Roxanne Smith (roxannesmith@orbitelcom.com)'; 'Roxanne Ziegler (rziegler@marana.com)'; 'Rudy Mix (rudy.mix@gric.nsn.us)'; 'Russell Bowers (rusty@azrockproducts.org)'; 'Ryan Benavides (rbenavides@marana.com)'; 'Ryan Mahoney (rmahoney@marana.com)'; 'sam_hosler@msn.com'; 'Sandie Smith (sandie@pinalpartnership.com)'; 'Sandy Bahr (sandy.bahr@sierraclub.org)'; 'sarah.walters@pima.gov'; 'Scott Weaver (scott.weaver@erm.com)'; 'Shane Kieso (skiesow@ajcity.net)'; 'Spencer Kamps (kampss@hbaca.org)'; 'Steve Cheslak (scheslak@marana.com)'; Steve Miller; 'Steve Murray (smurray@asarco.com)'; 'Steve Trussell (steve@azrockproducts.org)'; 'Steven Johnson - Gila River Indian Community (steven.johnson@gric.nsn.us)'; 'Susanna Struble (sstruble@coolidgeaz.com)'; 'thompson5155@msn.com'; 'tim.sturdavant@hexcel.com'; Todd House; 'tom.rankin@florenceaz.gov'; Travis Ashbaugh; 'Troy White (troy.white@queencreek.org)'; 'Ursula Nelson (ursula.nelson@pima.gov)'; 'Walter Ritcher (walter.ritcher@swgas.com)'; 'Wavalene Romero - Tohono O'odham Nation (wavalene.romero@tonation-nsn.gov)'; 'Wayne Costa (wayne.costa@florenceaz.gov)'; 'Wendy Crites (wmcrites@srpnet.com)'; 'William Sullivan (wsullivan@cgsuslaw.com)'; 'Yvonne Everlund (yes4change@yahoo.com)'

Cc: Michael Sundblom

Subject: RE: Pinal County Air Quality rulemakings - Public Notice Board of Supervisors Public Hearing October 28, 2015

Attachments: PCAQCD 2015 Public Notice CONSTRUCTION fugitive dust rulemaking BOS Publ....docx; PCAQCD 2015 Public Notice GENERAL FUGITIVE DUST rulemaking BOS Public He....docx

ar Stakeholders,

Please see the attached public notices for the BOS Public Hearing on October 28, 2015. They were inadvertently left off the email sent last Friday.

Scott DiBiase

From: Nelda Nunez
Sent: Friday, September 11, 2015 10:12 AM
To: 'Amanda McGennis'; 'Amy Courson'; Andrew Steckel (steckel.andrew@epa.gov); 'Andy Smith'; 'Angela Gotto'; 'Anna Flores'; Anthony Smith; 'Barbara Cenalmor (Barbara.CenalmorBruquetas@srpnet.com)'; 'Barney Barnes'; 'Basilio Aja'; 'Bill Fay'; 'Bill Sawyer'; 'Bob Jackson'; 'Brett Fera'; 'Brian Betcher'; 'bridger.kimball@maricopa-az.gov'; 'Bryant Powell (bpowell@ajcity.net)'; 'Cabrera.misael@azdeq.gov'; 'Candace Hughes (candiceshughes@aol.com)'; 'Carol McGorry'; 'Cathy Woolery'; 'Chales Montoya'; Cheryl Chase; 'Chip Wilson'; 'Chris Udall'; 'Christian Price'; 'Colleen McKaughan'; 'Cornelius Antone'; Dale Harman; 'Deborrah "Corkey" Martinkovic'; 'Dianne Prechel'; 'Dick Powell'; 'Don Gabrielson (dgabrielson6@mchsi.com)'; 'Don Shepherd (don_shepherd@nps.gov)'; Doug Hansen; 'Doug Sawyer (doug.sawyer@awin.com)'; 'Ed Honea (edhonea@marana.com)'; 'Edward Farrell (edward.farrell@maircopa-az.gov)'; 'Eric Anderson (eanderson@mag.maricopa.gov)'; 'Gail Barney (gail.barney@queencreek.org)'; 'Garth Bowers'; 'Giao Pham (gpham@ajcity.net)'; 'Gilbert Davidson (gdavidson@marana.com)'; 'gilbert.olgin@florenceaz.gov'; Gregory Stanley; 'Gregory Mendoza (executivemail@gric.nsn.us)'; 'Gregory.rose@maricopa-az.gov'; 'Hao Zhang (HZhang@trinityconsultants.com)'; 'Heather Hodgman (hhodgman@ajcity.net)'; 'Heidi Anderson (heidi.s.anderson@saic.com)'; Heidi Haggerty; 'Henry Darwin (hrd@azdeq.gov)'; 'Herb Kai (HERB@KAIFARMS.COM)'; krauss@ci.eloy.az.us'; Irene J. Higgs (ihiggs@scmpo.org); 'Jack Kolopanis (jkolopanis@wm.com)'; 'James Hull (azjrh@msn.com)'; 'Jane McVay (jmcvay@azdot.gov)'; 'jayme.valenzuela@superior-arizona.org'; 'jdinkle@accessarizona.org'; 'Jeff Sandquist (jsandquist@veridusaz.com)'; 'jhumble@ci.eloy.az.us'; 'Jim Thompson

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Cc: Michael Sundblom; Scott DiBiase
Subject: Pinal County Air Quality rulemakings - Public Notice Board of Supervisors Public Hearing October 28, 2015

Dear Stakeholder,

The rulemakings for the draft general fugitive dust and construction fugitive dust rules are ongoing. The rulemaking docket openings and combined notices of proposed rulemakings and oral proceedings were published in the Arizona Administrative Register (AAR) on August 28, 2015 (online at http://apps.azsos.gov/public_services/register/2015/35/28_county_notices.pdf). The Oral Proceedings for both rulemakings take place on September 28th, see below for details. Anyone that is interested in providing comments on the draft rules may do so by either emailing them to scott.dibiase@pinalcountyaz.gov or mailing them to Pinal County Air Quality, Attention: Scott DiBiase, 31 North Pinal St., Building F, P.O. Box 987, Florence, AZ. 85132 or providing written or oral comments at the respective oral proceeding on September 28th (see oral proceeding details below). The public comment period is ongoing and will close at the close of business on September 28th.

General fugitive dust oral proceeding – September 28, 2015, 10 a.m., 31 N. Pinal St., Building F, Ocotillo room.

Construction fugitive dust oral proceeding - September 28, 2015, 1 p.m., 31 N. Pinal St., Building F, Ocotillo room.

The last step in the rulemaking process is a public hearing with the Pinal County Board of Supervisors (BOS). The public notices (general fugitive dust & construction) for the Board of Supervisors public hearing on October 28, 2015 is attached. It is at the BOS public hearing where the BOS will be presented with the draft rules along with any comments received and will decide whether or not to adopt the proposed rules. The BOS public hearing is the final opportunity for the general public to make comments.

Please let me know if you have any questions and/or comments.

Sincerely,

Scott DiBiase
Pinal County Air Quality
(520)866-6969
Scott.dibiase@pinalcountyaz.gov

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

PINAL • COUNTY
wide open opportunity

Public Notice

Proposed Rulemaking

Board of Supervisors Public Hearing

Pinal County Air Quality proposes that the Board of Supervisors amend existing rules pertaining to air quality control. The ultimate purpose of this rulemaking proposal will be the submittal of the adopted rules through ADEQ to EPA, for inclusion as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act.

Ongoing violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standards (NAAQS) in Pinal County resulted in an Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal PM_{10} Nonattainment Area). A requirement of the redesignation is the development of a State Implementation Plan (SIP). The plan includes identification (i.e. emissions inventory) and solutions (i.e. rules) to the problem. The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality developed a PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area. The top three emissions sources in the base year PM_{10} emissions inventory are windblown dust (53%), unpaved roads (32%) and construction (9%). This rulemaking proposal addresses the general fugitive dust emissions associated with windblown dust, unpaved and paved roads.

Given the obligatory nature of this rulemaking proposal, it has followed the rulemaking process defined in A.R.S. §§49-112.D and 49-471. The combined notice of proposed rulemaking and oral proceeding was published in the Arizona Administrative Register (AAR) on August 28, 2015 (found online at www.azsos.gov) which started the official 30-day public comment period (which ends at the close of business on September 28, 2015). The Oral Proceeding will take place at 10 a.m. on September 28, 2015 in the Ocotillo room of Building F of the county complex located at 31 N. Pinal St., Florence, AZ.). The oral proceeding provides a formal opportunity for the public to make comments on the rulemaking proposal to the Pinal County Air Quality Control Officer. The rulemaking proposal along with a summary of any comments received will be submitted to the Board of Supervisors for consideration and possible adoption. The date, time and location of the Board of Supervisors public hearing-of-adoption is October 28, 2015, 9:30 a.m. at the Pinal County Administrative Complex, Board of Supervisors Hearing Room located at 135 N. Pinal Street, Florence, AZ. 85132.

The agenda for the Board of Supervisors meeting on October 28, 2015 can be found online at http://pinalcountyaz.gov/bos/Pages/AngendaMinutes.aspx.

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

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General Fugitive Dust Proposed Rulemaking
Oral Proceeding
Monday, September 28, 2015
10 AM
31 N. Pinal Street, Florence, AZ.
Building F, Ocotillo Room

1. Welcome & Introductions

2. Background

3. Proposed Rule

4. Comments

AIR QUALITY CONTROL DISTRICT
31 North Pinal Street, Building F, PO Box 987 Florence, AZ 85132 **T** 520-866-6929 **FREE** 888-431-1311 **F** 520-866-6967 www.pinalcountyaz.gov

PINAL • COUNTY

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PINAL COUNTY AIR QUALITY CONTROL DISTRICT
31 N. PINAL ST., FLORENCE, ARIZONA 85132

DRAFT GENERAL FUGITIVE DUST RULE ORAL PROCEEDING
SEPTEMBER 28, 2015 10 A.M. OCOTILLO ROOM, BUILDING F

Name	Organization	Address	Phone Number	Email
Mike Sundblom	PCAQCD	31 N. Pinal St. Florence AZ	520-866-6915	Michael.sundblom@pinalcountyaz.gov
Scott DiBiase	"	"	520 866 6969	Scott.dib.nse@pinalcount.az.gov
Kale Walch	"	"	520-866-6860	kale.walch@pinalcountyaz.gov

6. PUBLIC COMMENT

Pinal County Air quality

Concise Explanatory Statement

Pertaining to Proposed Revisions to the Pinal County Air Quality Control District Code of Regulations Scheduled for Consideration by the Board of Supervisors on October 28, 2015

See 21 A.A.R. Pg. 11730 (8/28/15) for Background

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1. Pinal County Air Quality proposed a number of additions to local air quality rules related to general fugitive dust emissions in the West Pinal moderate PM_{10} Nonattainment Area. The notice of docket opening and combined notice of proposed rulemaking and oral proceeding were published in the Arizona Administrative Register on August 28, 2015 (See 21 A.A.R. 1730).

2. The A.A.R. notice scheduled an oral proceeding before the Control Officer for September 28, 2015, and scheduled a close to the public comment period at the close of business on that day.

   Written comments from Barbara Sprungl (Manager, Air Quality & Environmental Systems, Salt River Project) were received.

3. Review of the comments received resulted in the following response to comments:

   Pinal County Air Quality Control District (PCAQCD) Responses to September 28, 2015 comments submitted by Barbara Sprungl, Manager, Air Quality & Environmental Systems, Salt River Project SRP.

   RE: SRP Comments in Response to the Proposed Revisions to PCAQCD's "General Fugitive Dust" Rule (Chapter 4, Article 1, West Pinal PM10 Moderate Nonattainment Area Fugitive Dust)

   Comment No. 1 - Definitions of "Open Areas/Vacant Lots" and "Unpaved Lots"

   During the stakeholder meeting held on September 1, 2015, Kale Walch of PCAQCD indicated that unpaved areas within the boundaries of stationary sources already permitted do not fall under the definition of "Open Areas/Vacant Lots", but instead fall under the definition of "Unpaved Lots". In order to avoid future misunderstandings and a potential overlap of the standards applicable to unpaved areas within the boundaries of stationary sources, PCAQCD should ensure that the current definitions are clear by including a statement under the definition of "Open Areas/Vacant Lots" that exempts unpaved areas within permitted stationary sources from this definition.

PCAQCD Response

Due to the type of sources identified in the emission inventory Chapter 4, Article 1 applies to all area sources, regardless of whether or not a source has a stationary permit under Chapter 3. Pinal County Air Quality will work with stationary sources to list the applicable portions of Chapter 4, Article 1 and 2 in stationary permits as they are issued.

It is likely that the most common applicable section will be the unpaved lot section of the rule since this includes parking, maneuvering, material handling yards and other related activities that are common at stationary sources. The open area / vacant lot section may or may not be referenced in a stationary permit. Many facilities own open areas / vacant lots that are adjacent to the permitted facility but these vacant parcels may not be listed on the stationary permit. In this case the open area / vacant lot portion of Chapter 4, Article 1 would not be listed in the stationary permit, but would still be an applicable requirement for the property owner.

Comment No. 2 - Definition of "Unpaved Roads"

During the stakeholder meeting held on September 1, 2015, PCAQCD staff presented the requirements for "Unpaved Roads" by referring to "Public Unpaved Roads". The slides from that meeting's presentations, which are posted on the PCAQCD website, include slides on "Public Unpaved Roads". Yet, the term "Public" does not appear in Definition 16 of the proposed rule, or anywhere within the requirements of §4-1-030.4. While the definition of "Unpaved Roads" does indicate that the roads must be owned by federal, state, county, municipal, or other government agencies, PCAQCD should clarify that the intent of this rule is to only regulate "Public Unpaved Roads".

Additionally, PCAQCD should add roads that are subject to the State's Agricultural Best Management Practices or that are managed by an Irrigation District to the exemptions provided under this definition.

PCAQCD Response

The Combined Notice of Proposed Rulemaking and Oral Proceeding published in the Arizona Administrative Register (AAR 21, 1731, August 28, 2015), in the Preamble, section G (Economic, small business and consumer impact statement), the unpaved roads sections defines the 'regulated community' as Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek (i.e. public unpaved roads). Thus adding a point of clarification that the County and incorporated cities and their public unpaved roads are regulated.

Any roads subject to the State's Agricultural Best Management Practices or that are managed by an Irrigation District are excluded from the proposed rules in §4-1-015(3) since that exemption specifically points to Arizona Department of Environmental Quality

(ADEQ) rules that regulate agricultural unpaved roads (R18-2-610, R18-2-610.01) and irrigation districts (ARS §49-457).

Comment No. 3 - Requirements for Unpaved Lots

To ensure consistency with the requirements for "Open Areas/Vacant Lots" in §4-1-030.2.D, where it indicates that the acreage that triggers the requirements is cumulative, PCAQCD should also clarify that the acreage trigger under "Unpaved Lots" is on a cumulative basis. Large stationary sources may have several unpaved areas all separated by paved areas or paved roads.

PCAQCD Response

The significant spatial expanse of open areas/vacant lots necessitated cumulative regulatory language in order to control a wide swath of the West Pinal County PM10 Nonattainment Area. Meanwhile the spatial scale of unpaved lots in the nonattainment area is understandably smaller comparatively. Therefore there wasn't the need to have cumulative language in the unpaved lots section of the rule.

Comment No. 4 - Reporting Requirements

Section §4-1-045 of the proposed rule requires annual reporting of unpaved roads to PCAQCD, including a list of the roads, length of the roads, and the number of Average Daily Trips (ADT}, as well as another annual report showing the roads that were paved during the previous year. With this requirement, PCAQCD should include an exemption for public roads covered under the State's Agricultural Best Management Practices or should refer to the proposed exemption under the definition of (/Unpaved Road" (see Comment No. 2 above).

PCAQCD Response

The reporting requirements in §4-1-045 are only for city, county or state agency with primary responsibility for any existing paved public roadway and unpaved roads.

As for the requirements under the State's Agricultural Best Management Practices, public roads aren't regulated directly. However use of paved public roads is a control measure in R18-2-612.01 to reduce PM emissions from irrigation district unpaved operation and maintenance roads and unpaved utility access roads. As it relates to the proposed PCAQCD rules, any agricultural activities are exempt since they are regulated in ADEQ rules (see PCAQCD response to comment #2 above).

4. Further review by Air Quality staff of the changes proposed in the A.A.R. notice has identified a number of additional ministerial and typographical changes that are required. Those changes, none of which are substantive in nature, include the following:
    - Corrected erroneous reference in §4-1-015.4 from Chapter 4, Article 10 to Chapter 4, Article 1.
    - Corrected numbering in §4-1-030.5.A.i from i through iv in the AAR notice to a to d.

- Corrected numbering reference in 4-1-030.4.B.2 from 4-1-030.5.A.1 to 4-1-030.5.A.i

7. EVIDENCE OF LEGAL ADOPTION

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AGENDA ITEM

October 28, 2015 ADMINISTRATION BUILDING A
FLORENCE, ARIZONA

REQUESTED BY:

Funds #: 86

Dept. #: 3140180

Dept. Name: Air Quality

Director: Michael Sundblom

BRIEF DESCRIPTION OF AGENDA ITEM AND REQUESTED BOARD ACTION:

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ2, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from unpaved lots, open area/vacant lots, and paved and unpaved roads. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes. (Mike Sundblom/Greg Stanley)

BRIEF DESCRIPTION OF THE FISCAL CONSIDERATIONS AND/OR EXPECTED FISCAL IMPACT OF THIS AGENDA ITEM:

BRIEF DESCRIPTION OF THE EXPECTED PERFORMANCE IMPACT OF THIS AGENDA ITEM:

MOTION:

Approve Resolution No. 082615-AQ2

History

Time	Who	Approval

10/22/2015 8:30 AM	County Attorney	Yes
10/22/2015 8:30 AM	Air Quality	Yes
10/22/2015 11:05 AM	County Manager	Yes
10/22/2015 2:06 PM	Clerk of the Board	Yes

ATTACHMENTS:

Click to download

- Resolution
- Concise Explanatory Statement

When recorded return to:
Clerk of the Board
Pinal County
P.O. Box 827
Florence, Arizona 85232

PINAL COUNTY BOARD OF SUPERVISORS
RESOLUTION NO. 102815-AQ2
PINAL COUNTY AIR QUALITY CONTROL DISTRICT

A RESOLUTION OF THE BOARD OF SUPERVISORS OF PINAL COUNTY, ADOPTING CERTAIN REVISIONS TO THE PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AND REQUESTING THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY SUBMIT THE REVISIONS TO THE ENVIRONMENTAL PROTECTION AGENCY AS AN ELEMENT OF THE ARIZONA STATE IMPLEMENTATION PLAN.

WHEREAS, the Pinal County Board of Supervisors ("Board") is empowered under A.R.S. §49-479 to adopt rules for the purpose of controlling the release of air contaminants within the County;

WHEREAS, ongoing PM_{10} exceedances in Pinal County resulted in a July 2, 2012 Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal Moderate PM_{10} Nonattainment Area – defined in 40 CFR 81.303).;

WHEREAS, the base year (2008) PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area quantified general fugitive emissions as a significant source category;

WHEREAS, Clean Air Act requirements (§172(c)) include developing control measures that reduce emissions from significant source categories;

WHEREAS, Pinal County in coordination with stakeholders, EPA and Arizona Department of Environmental Quality (ADEQ) developed a West Pinal PM_{10} Nonattainment area general fugitive dust rule that provides the necessary control measures to reduce PM_{10} emissions attributed to windblown dust and unpaved roads;

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WHEREAS, to the extent applicable, the District has complied with the notice-publication and other public notification requirements of A.R.S. §§49-471.04 and 49-479, and 40 C.F.R. §51-102, including a combined notice of proposed rulemaking and oral proceeding published at 21 A.A.R. 1730 (8/28/15);

WHEREAS, the elements of the final proposed changes in the County's air quality rules are set forth below in full;

THEREFORE, FOR THE PURPOSE OF PROTECTING AND PRESERVING THE QUALITY OF AIR WITHIN THE COUNTY IN A SENSIBLE AND ORDERLY MANNER, IT IS HEREBY RESOLVED BY THE BOARD TO:

1. **Adopt the following revisions, additions and deletions to the Pinal County Air Quality Control District Code of Regulations, the full text of which follows the indicated field markers.**
2. **Direct Pinal County Air Quality to submit the adopted rules (excluding §1-1-105) to the Arizona Department of Environmental Quality (ADEQ) with the request that they be submitted to the Environmental Protection Agency (EPA) for inclusion in the Arizona State Implementation Plan (SIP).**

***

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).

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h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or

7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~
WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C., Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

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4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.

a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.

9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule,

maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

   A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.
   B. The owner and/or operator shall implement applicable control measures.
   C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.
   D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

i. Apply and maintain water or dust suppressants; or
ii. Establish vegetation; or
iii. Install and maintain pavement; or
iv. Apply and maintain gravel uniformly; or
v. Apply and maintain chemical/organic stabilizers/suppressants; or
vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.
   iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or
   ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or
   iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or
   iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or
   v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES:**

a. Pave; or
b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or
c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or
d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal

to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES**:

a. Pave; or

b. Apply and maintain dust suppressants other than water; or

c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and

2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

   i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)
      a. Manually sweeping and picking up; or
      b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
      c. Operating a PM10 efficient street sweeper; or
      d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

   ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

   iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.
   ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

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4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.
B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
   i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.
   ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

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IN WITNESS WHEREOF, the undersigned, in accord with the vote of the Pinal County Board of Supervisors as duly reflected in the minutes of the Board meeting, have executed this document on behalf of the Board of Supervisors on this _____ day of _____, 2015.

PINAL COUNTY, a political subdivision of the State of Arizona,

By: _____
Chairwoman of the Board of Supervisors

ATTEST: _____
Clerk of the Board of Supervisors

APPROVED AS TO FORM:

Lando Voyles
Pinal County Attorney

By: _____
Deputy County Attorney

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Pinal County Air quality

Concise Explanatory Statement

Pertaining to Proposed Revisions to the Pinal County Air Quality Control District Code of Regulations Scheduled for Consideration by the Board of Supervisors on October 28, 2015

See 21 A.A.R. Pg. 11730 (8/28/15) for Background

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1. Pinal County Air Quality proposed a number of additions to local air quality rules related to general fugitive dust emissions in the West Pinal moderate PM_{10} Nonattainment Area. The notice of docket opening and combined notice of proposed rulemaking and oral proceeding were published in the Arizona Administrative Register on August 28, 2015 (See 21 A.A.R. 1730).

2. The A.A.R. notice scheduled an oral proceeding before the Control Officer for September 28, 2015, and scheduled a close to the public comment period at the close of business on that day.

   Written comments from Barbara Sprungl (Manager, Air Quality & Environmental Systems, Salt River Project) were received.

3. Review of the comments received resulted in the following response to comments:

   Pinal County Air Quality Control District (PCAQCD) Responses to September 28, 2015 comments submitted by Barbara Sprungl, Manager, Air Quality & Environmental Systems, Salt River Project SRP.

   RE: SRP Comments in Response to the Proposed Revisions to PCAQCD's "General Fugitive Dust" Rule (Chapter 4, Article 1, West Pinal PM10 Moderate Nonattainment Area Fugitive Dust)

   Comment No. 1 - Definitions of "Open Areas/Vacant Lots" and "Unpaved Lots"

   During the stakeholder meeting held on September 1, 2015, Kale Walch of PCAQCD indicated that unpaved areas within the boundaries of stationary sources already permitted do not fall under the definition of "Open Areas/Vacant Lots", but instead fall under the definition of "Unpaved Lots". In order to avoid future misunderstandings and a potential overlap of the standards applicable to unpaved areas within the boundaries of stationary sources, PCAQCD should ensure that the current definitions are clear by including a statement under the definition of "Open Areas/Vacant Lots" that exempts unpaved areas within permitted stationary sources from this definition.

PCAQCD Response

Due to the type of sources identified in the emission inventory Chapter 4, Article 1 applies to all area sources, regardless of whether or not a source has a stationary permit under Chapter 3. Pinal County Air Quality will work with stationary sources to list the applicable portions of Chapter 4, Article 1 and 2 in stationary permits as they are issued.

It is likely that the most common applicable section will be the unpaved lot section of the rule since this includes parking, maneuvering, material handling yards and other related activities that are common at stationary sources. The open area / vacant lot section may or may not be referenced in a stationary permit. Many facilities own open areas / vacant lots that are adjacent to the permitted facility but these vacant parcels may not be listed on the stationary permit. In this case the open area / vacant lot portion of Chapter 4, Article 1 would not be listed in the stationary permit, but would still be an applicable requirement for the property owner.

Comment No. 2 - Definition of "Unpaved Roads"

During the stakeholder meeting held on September 1, 2015, PCAQCD staff presented the requirements for "Unpaved Roads" by referring to "Public Unpaved Roads". The slides from that meeting's presentations, which are posted on the PCAQCD website, include slides on "Public Unpaved Roads". Yet, the term "Public" does not appear in Definition 16 of the proposed rule, or anywhere within the requirements of §4-1-030.4. While the definition of "Unpaved Roads" does indicate that the roads must be owned by federal, state, county, municipal, or other government agencies, PCAQCD should clarify that the intent of this rule is to only regulate "Public Unpaved Roads".

Additionally, PCAQCD should add roads that are subject to the State's Agricultural Best Management Practices or that are managed by an Irrigation District to the exemptions provided under this definition.

PCAQCD Response

The Combined Notice of Proposed Rulemaking and Oral Proceeding published in the Arizona Administrative Register (AAR 21, 1731, August 28, 2015), in the Preamble, section G (Economic, small business and consumer impact statement), the unpaved roads sections defines the 'regulated community' as Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek (i.e. public unpaved roads). Thus adding a point of clarification that the County and incorporated cities and their public unpaved roads are regulated.

Any roads subject to the State's Agricultural Best Management Practices or that are managed by an Irrigation District are excluded from the proposed rules in §4-1-015(3) since that exemption specifically points to Arizona Department of Environmental Quality

(ADEQ) rules that regulate agricultural unpaved roads (R18-2-610, R18-2-610.01) and irrigation districts (ARS §49-457).

Comment No. 3 - Requirements for Unpaved Lots

To ensure consistency with the requirements for "Open Areas/Vacant Lots" in §4-1-030.2.D, where it indicates that the acreage that triggers the requirements is cumulative, PCAQCD should also clarify that the acreage trigger under "Unpaved Lots" is on a cumulative basis. Large stationary sources may have several unpaved areas all separated by paved areas or paved roads.

PCAQCD Response

The significant spatial expanse of open areas/vacant lots necessitated cumulative regulatory language in order to control a wide swath of the West Pinal County PM10 Nonattainment Area. Meanwhile the spatial scale of unpaved lots in the nonattainment area is understandably smaller comparatively. Therefore there wasn't the need to have cumulative language in the unpaved lots section of the rule.

Comment No. 4 - Reporting Requirements

Section §4-1-045 of the proposed rule requires annual reporting of unpaved roads to PCAQCD, including a list of the roads, length of the roads, and the number of Average Daily Trips (ADT}, as well as another annual report showing the roads that were paved during the previous year. With this requirement, PCAQCD should include an exemption for public roads covered under the State's Agricultural Best Management Practices or should refer to the proposed exemption under the definition of (/Unpaved Road" (see Comment No. 2 above).

PCAQCD Response

The reporting requirements in §4-1-045 are only for city, county or state agency with primary responsibility for any existing paved public roadway and unpaved roads.

As for the requirements under the State's Agricultural Best Management Practices, public roads aren't regulated directly. However use of paved public roads is a control measure in R18-2-612.01 to reduce PM emissions from irrigation district unpaved operation and maintenance roads and unpaved utility access roads. As it relates to the proposed PCAQCD rules, any agricultural activities are exempt since they are regulated in ADEQ rules (see PCAQCD response to comment #2 above).

4. Further review by Air Quality staff of the changes proposed in the A.A.R. notice has identified a number of additional ministerial and typographical changes that are required. Those changes, none of which are substantive in nature, include the following:
    - Corrected erroneous reference in §4-1-015.4 from Chapter 4, Article 10 to Chapter 4, Article 1.
    - Corrected numbering in §4-1-030.5.A.i from i through iv in the AAR notice to a to d.

- Corrected numbering reference in 4-1-030.4.B.2 from 4-1-030.5.A.1 to 4-1-030.5.A.i

CLOSE

PINAL • COUNTY
Wide open opportunity

NOTICE OF PUBLIC MEETING AND EXECUTIVE SESSION
PINAL COUNTY BOARD OF SUPERVISORS
SUMMARY OF AGENDA FOR REGULAR SESSION

Wednesday, October 28, 2015

9:30 AM - CALL TO ORDER

PINAL COUNTY ADMINISTRATIVE COMPLEX
BOARD OF SUPERVISORS HEARING ROOM
135 N. PINAL STREET
FLORENCE, AZ 85132

PLEDGE OF ALLEGIANCE - INVOCATION

BUSINESS BEFORE THE BOARD

(Consideration/Approval/Disapproval of the following:)

(1) Call to Public -
Consideration and discussion of comments from the public. Those wishing to address the Pinal County Board of Supervisors need not request permission in advance. Action taken as a result of public comment will be limited to directing staff to study the matter or rescheduling the matter for further consideration and decision at a later date.

(2) Recognition of Public Works Employee, Ray Garcia, for his assistance and participation in an emergency rescue. (Louis Andersen)

(3) Presentation of Certificates of Service to employees for 20, 25 and 30 years of service. (Stephanie Maack)

(4) County Manager's Report (Information Only). (Greg Stanley)

(5) Purchasing Division Report - October 28, 2015 (Randon Riffey/Leo Lew)

(6) **CONSENT ITEMS**: All items indicated by an asterisk (*) will be handled by a single vote as part of the consent agenda, unless a Board Member, County Manager, or member of the public objects at the time the agenda item is called.

***A.** Discussion/approval/disapproval of the Minutes of October 7, 2015. (Sheri Cluff)

***B.** Discussion/approval/disapproval of the current billings before the Board. (Sheri Cluff)

***C.** Discussion/approval/disapproval to direct the Pinal County Finance Department to issue a replacement check to Emodeon Business Services in the amount of $54.75. Check No. 0293267228 dated 10/27/2011 was never cashed and is now stale dated.

***D.** Discussion/approval/disapproval of an Intergovernmental Agreement between Pinal County and the City of Eloy regarding participation in the Pinal County "Safety Roadeo". (Jack Flindt/Greg Stanley)

***E.** Discussion/approval/disapproval of a Temporary Construction Easement from RI CS1, LLC. A Delaware limited liability company, owner of parcel 210-18-004B, for Hunt Highway Widening Project Phase III, located in a portion of Section 18, T3S, R8E, Supervisory District #2, in the unincorporated area of Pinal County, Arizona, as described in the legal description attached hereto. (GA15-007) (Dale Harman/Louis Andersen)

***F.** Discussion/approval/disapproval of Resolution No. 102815-GA15-008 authorizing Pinal County to enter into a license agreement with United States of America, Department of Energy, Western Area Power Administration, for the purpose of defining responsibilities in a certain traffic signal at the intersection of Gantzel Road and Chandler Heights Road and authorizing the Pinal County Engineer to execute said license agreement. Located in Supervisory District #2, Section 20, T2 S, R 8 E in the unincorporated area of Pinal County, Arizona, as described in the attached hereto and made a part of said Resolution. (GA15-008) (Dale Harman/Louis Andersen)

***G.** Discussion/approval/disapproval of Resolution No. 102815-GA15-009 accepting an agreement to donate easement and waiver of appraisal and compensation and Deed of Easement from F&M LLC., located in a portion of Section 24, T7S, R6E, Supervisory District #4, in the unincorporated area of Pinal County, Arizona, as legally described in Exhibits A attached to said Resolution. (GA15-009) (Dale Harman/Louis Andersen)

***H.** Discussion/approval/disapproval of Resolution No. 102815-GA15-010 approving a road construction participation agreement with Psalm 91 LLC., to define responsibilities and financial commitments. (GA15-010) (Dale Harman/Louis Andersen)

***I.** Discussion/approval/disapproval of the Pinal County Board of Supervisors to accept the Homeland Security Grant Program Award in the amount of $146,250.00, managed by the

Arizona Department of Homeland Security (AZDOHS) through Public Works, for the period of 10/01/15 to 09/30/16. This does not require a FY 15/16 budget amendment as the funds were approved in the FY 15/16 budget. This has no impact on the General Fund. (GA15-011) (Charles Kmet/Louis Andersen)

*J. Discussion/approval/disapproval of Resolution No. 102815-RD15-023 accepting an easement for sidewalk purposes on parcel 210-19-057D, from Johnson Ranch Holdings, LLC, located in a portion of Section 19, T3S, R8E, along Bella Vista Blvd., Supervisory District #2, in the unincorporated area of Pinal County, Arizona, as legally described in Exhibit A attached to said Resolution. (RD15-023) (Dale Harman/Louis Andersen)

*K. Discussion/approval/disapproval of Resolution No. 102815-RD15-024 accepting a dedication of easement for a public street and roadway purposes in connection with the Pavilions at San Tan Heights, located within section 12, T3S, R7E, Supervisory District # 2, in the unincorporated area of Pinal County, Arizona. (RD15-024) (Dale Harman/Louis Andersen)

*L. Discussion/approval/disapproval of Resolution No. 102815-RD15-029 approving the purchase of a perpetual right and easement in the amount of $33,400.00 and title charges in the amount of $1,237.00 for a total of $34,637.00, from Leon M. Yoakum, for the Price Road Realignment Project located in a portion of Section 16, T4S, R10E, Supervisory District 2, in the unincorporated area of Pinal County, Arizona. (RD15-029) (Dale Harman/Louis Andersen)

*M. Discussion/approval/disapproval of Partial Release of Third Party Trust Assurance Agreement for Construction of Subdivision Improvements for Eagle Crest Ranch V, Lots 822 and 827. (RD15-031) (Tara Harman/Louis Andersen)

*N. Discussion/approval/disapproval of the appointment of the Pinal Workforce Development Board (PWDB) Nominee, Timothy Durkee, to serve from October 28, 2015 to October 27, 2019. (Adeline Allen/Leo Lew)

*O. Discussion/approval/disapproval of the Grant-in-Aid Agreement between the Tohono O'odham Nation and Pinal County, through the Pinal County Attorney's Office in the amount of $35,922 to provide funding to the Pinal County Family Advocacy Centers. The grant program is scheduled for one year from the execution of the award agreement with funding anticipated to be received by November 30, 2015. This funding consists of monies for printing costs for the Pinal County Attorney's Family Advocacy Center Parent Guide and personnel expenses including a part-time Victim Witness Advocate position. The award requires approval from the Board of Supervisors to establish a part-time Victim Witness Advocate position (Position #TBD/Grade 123) Step 1 Salary up to 21 hours per week ($25,922 including ERE). This requires a FY 15/16 budget amendment, moving revenues and expenditures from Fund 213 to provide budget capacity. There is no impact to the General Fund. (Lando Voyles)

*P. Discussion/approval/disapproval of Resolution No. 102815-MSIDD cancelling the November 10, 2015 election to fill three open board positions for the Maricopa-Stanfield Irrigation & Drainage District. Three candidates submitted nomination paperwork and the District asks the Board to appoint these three candidates to fill the open board positions. (Michele Forney)

*Q. Discussion/approval/disapproval of Resolution No. 102815-CAIDD cancelling the November 10, 2015 election to fill three open board positions for the Central Arizona Irrigation & Drainage District. Three candidates submitted nomination paperwork and the District asks the Board to appoint these three candidates to fill the open board positions. (Michele Forney)

*R. Discussion/approval/disapproval of Precinct Committeemen Appointments: Democratic: PCT 33, Lisa Fitzgibbons, 127 E. Laurel Circle, Casa Grande, AZ 85122; PCT 60, Audra Lee Antone, 10140 Mawid Sacaton, Sacaton, AZ 85147; PCT 14, Mary L. Duarte, 411 E. 3rd Street, Eloy, AZ 85131. (Michele Forney)

(7) Meeting of the Pinal County Flood Control District Board of Directors. (Elise Moore/Louis Andersen)

(8) Meeting of the Pinal County Library District Board of Directors. (Denise Keller)

(9) **9:30 a.m.** The following cases will be heard without additional input from the applicant or public unless prior to the time the case is publically heard, the applicant, a staff member or a member of the public requests that a case be considered

separately. In the event that no such request for a hearing is made, the Board shall vote to approve the recommendation of the Commission.

A. SUP-003-15: Sidewinder Dairy, Inc., landowner/applicant, Rose Law Group, agent, requesting approval of a Special Use Permit to plan and develop a medical marijuana off-site cultivation location on a 50.0± acre parcel in the General Rural (GR) zone; situated in a portion of the SW¼ of Section 24, T06S, R07E G&SRB&M, tax parcels 401-12-002G (legal on file) (located on the north side of Highway 287, ½ mile west of Eleven Mile Corner Rd.) Planning Commission voted 7-2 to recommend approval of SUP-003-15 with 2 stipulations. (Ashlee MacDonald/Himanshu Patel)

B. SUP-009-15: Rube and Carolyn Woolsey landowners, Sun State Towers, applicant, Pinnacle Consulting, Inc, agent, requesting approval of a Special Use Permit to construct and operate a 120' wireless communication facility on a 50' x 50' lease area of a 7.0± acre parcel in the General Rural (GR) zone; situated in a portion of the NE¼ of Section 35, T05S, R06E G&SRB&M, tax parcels 515-35-023 (legal on file) (located off of Henness Rd, east of I-10 in the Casa Grande area.) Planning Commission voted 5-4 to recommend denial of SUP-009-15. (Ashlee MacDonald/Himanshu Patel)

(10) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-RD15-025, on the extinguishment of a portion of that easement for a public highway (also known as North Pamela Drive), as recorded in Docket 366, Page 48, Records of Pinal County, Arizona, being the West 50.00 of GLO Lot 1, within Supervisor District 2, Section 12, Township 3 South, Range 7 East, in the unincorporated area of Pinal County, Arizona. (RD15-025) (Stephanie Sullivan/Louis Andersen)

(11) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-RD15-026 , on the extinguishment of a portion of that easement for a public highway (also known as West Skyline Drive), as recorded in Docket 66, Page 126, Records of Pinal County, Arizona, lying within the North 40.00 feet Section 12, Township 3 South, Range 7 East, within Supervisor District 2, in the unincorporated area of Pinal County, Arizona. (RD15-026) . (Stephanie Sullivan/Louis Andersen)

(12) Discuss/Reject or set a date for a Public Hearing for the Board Initiative on the Abandonment of a portion of Cameron Street, 20 feet wide, commencing at Arizola Road and proceeding easterly for 867.43 feet to the point of termination, located within Supervisory District #3, Section 34, T6S, R6E, within the unincorporated area of Pinal County, Arizona; to direct the County Engineer to cause a survey to be made or use available data and maps, if any, and file a report together with a survey map on the proposed abandonment/extinguishment from the County Engineer. (RD15-027) (Stephanie Sullivan/Louis Andersen)

(13) Discuss/Reject or set a date for a Public Hearing to consider the County Engineer's recommendation to establish a part of Davis Ranch Road, (as a county highway) 40 feet wide, commencing at Cattletank Road and proceeding east for approximately one (1) mile terminating at Jacy Trail, located in Section 29, Township 10 South, Range 11 East, within the unincorporated area of Pinal County, and lying within Supervisory District #4. (RD15-028) (Stephanie Sullivan/Scott Bender/Louis Andersen)

(14) Discuss/Reject or set a date for a Public Hearing for the Board Initiative on the Abandonment of a portion of Sundrift Drive, 80 feet wide, commencing at Treasure Road and proceeding southeasterly for 2,444.42 feet to the point of termination, located within Supervisory District #4, Section(s) 8 & 9, T10S, R10E, within the unincorporated area of Pinal County, Arizona; to direct the County Engineer to cause a survey to be made or use available data and maps, if any, and file a report together with a survey map on the proposed abandonment/extinguishment from the County Engineer. (RD15-030) (Stephanie Sullivan/Louis Andersen)

(15) Public Hearing and discussion/approval/disapproval on the following requested major amendments to the 2009 Pinal County Comprehensive Plan. Although this is one public hearing covering all the following requests, the Supervisors may ask the public to speak on each major amendment request separately and may discuss and vote on each request separately.

A. PZ-PA-001-15: A request by the Community Development Department for a major amendment of the Pinal County Comprehensive Plan to amend the text of Chapter 8: Healthy Happy Residents; to add a subsection titled Healthy Places that will include new Goals, Objectives and Policies that will address the availability of healthy food, and community supported agriculture. The Planning Commission voted 5-4 to

recommend denial of PZ-PA-001-15 with no stipulations. (Ashlee MacDonald/Himanshu Patel)

B. PZ-PA-002-15: : A request by the Community Development Department for a major amendment of the Pinal County Comprehensive Plan to amend the text Chapter 3: Sense of Community to add Green Energy Production as a new land use designation under "Additional Land Use Designations"; and amend the text of Chapter 10: Implementation to allow requests to the "Green Energy Production" designation as non-major amendments up to 640 acres. The Planning Commission voted unanimously (9-0) to recommend approval of PZ-PA-002-15 with no stipulations. (Steve Abraham/Himanshu Patel)

C. PZ-PA-004-15: A request by San Tan 320, LLC. to amend the 2009 Pinal County Comprehensive Plan by changing the land use designation from Very Low Density Residential (0-1 du/ac) to Low Density Residential (0-2 du/ac) on approximately 320.73± acres, situated in a portion of Sections 15 and 22, T03S, R07E located adjacent to the south side of Phillips Road approximately .5 miles west of Thompson Road. The Planning Commission voted unanimously (9-0) to recommend approval of PZ-PA-004-15 with no stipulations. (Evan Balmer/Himanshu Patel) (Dedrick Denton/Himanshu Patel)

(16) Public Hearing and discussion/approval/disapproval of the petition to organize the Red Rock Irrigation and Drainage District per A.R.S. 48-2907 and for additional action on the petition as per A.R.S. 48-2905(B) (continued from October 7, 2015). (Pamela Villarreal/Kevin Costello)

(17) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ1, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from construction activity. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes. (Mike Sundblom/Greg Stanley)

(18) Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ2, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from unpaved lots, open area/vacant lots, and paved and unpaved roads. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes. (Mike Sundblom/Greg Stanley)

(19) Executive session pursuant to ARS 38-431.03(A)(3) for legal advice concerning SunZia transmission line proposal and position of parties. (Greg Stanley/Chris Keller)

ADJOURNMENT

(SUPPORTING DOCUMENTS ARE AVAILABLE AT THE BOARD OF SUPERVISORS' OFFICE)

The Board may go into executive session for purposes of obtaining legal advice from the County's Attorney(s) on any of the above agenda items pursuant to A.R.S. 38-431.03(A)(3).

Regular Session October 28, 2015

A video recording of this meeting and presentations can be viewed at www.pinalcountyaz.gov

The Pinal County Board of Supervisors convened at 9:32 A.M. this date in the Board of Supervisors Hearing Room, 135 N. Pinal Street, Florence, Arizona. The meeting was called to order by Chairwoman Chase followed by an Invocation by Chaplain Jack Siddle and the Pledge of Allegiance.

Present: Chairwoman Cheryl Chase; Vice-Chairman Pete Rios; Supervisor Stephen Q. Miller; Supervisor Anthony Smith; Supervisor Todd House; County Manager, Greg Stanley; Chief Civil Deputy County Attorney, Chris Keller; and Assistant to the Clerk of the Board, Diane Gardner.

Call to Public –

Barry McCain, Arizona City, discussed the importance of the Constitution and due process.

Neil Macdonald, SaddleBrooke, appeared before the Board and advised that he is the Vice President of Communications for SaddleBrooke. He stated that they have almost 800 members in the group and from time to time they will come before the Board to provide honest appraisals of what they see happening and supportive of things that need to happen.

Point of Personal Privilege

Supervisor Smith took a point of personal privilege to recognize that early in the week, the City of Maricopa was awarded a $15 million Tiger Grant. This is significant to expediting a very important regional transportation item that is called the Great Separation Project. Supervisor Smith thanked the Congressional Delegation especially Congresswoman Kirkpatrick for her long diligent work in making this a reality.

Supervisor Rios also wanted to thank Congresswoman Kirkpatrick for the $15 million Tiger Grant. These grants are very rare and far apart and the improvements to State Route 347 are vitally needed.

Supervisor Rios stated that as we get into the political season, staff needs to be careful about making public political statements.

Recognition of Public Works Employee, Ray Garcia, for his assistance and participation in an emergency rescue.

Chairwoman Chase opened the public hearing.

Mr. Sundblom said he had received a letter of support for the rule from Amanda McGinnis, Sr. Vice President of the Arizona General Contractors.

Spencer Kamps, Homebuilders Association of Central Arizona appeared before the Board and stated that the Homebuilders Association stands in support of the rule that the County has put forward and encouraged the Board to adopt it.

Chairwoman Chase closed the public hearing.

Motion was made by Supervisor Rios and seconded by Supervisor Miller to approve Resolution 102815-AQ1 a Resolution pursuant to Title 49 of the Arizona Revised Statutes adopting all of the proposed changes to local air quality rules. Motion carried by unanimous vote.

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ2, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from unpaved lots, open area/vacant lots, and paved and unpaved roads. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes.

Mike Sundblom, Air Quality Director, again appeared before the Board requesting approval of Resolution No. 102815-AQ2 regarding the adoption of proposed changes to local air quality rules regarding the fugitive dust rule. The changes involve establishing reasonable available control measures for PM10 generated from unpaved lots, open area/vacant lots and paved and unpaved roads. Mr. Sundblom's presentation can be viewed on the Board of Supervisor's Website.

Chairwoman Chase opened the public hearing. There was no one who wished to speak so she closed the public hearing.

Motion was made by Supervisor Rios and seconded by Supervisor Miller to approve Resolution 102815-AQ2 a Resolution pursuant to Title 49 of the Arizona Revised

Statutes adopting all of the proposed changes to local air quality rules. Motion carried by unanimous vote.

Executive Session:

Motion was made by Supervisor House and seconded by Supervisor Miller to recess regular session of the Board of Supervisors and convene into executive session. Motion carried by unanimous vote.

12:47 p.m. - Executive session pursuant to ARS 38-431.03(A)(3) for legal advice concerning SunZia transmission line proposal and position of parties.

Present: Chairwoman Chase; Vice-Chairman Pete Rios; Supervisor Stephen Q. Miller; Supervisor Anthony Smith; Supervisor Todd House; County Manager, Greg Stanley; Chief Civil Deputy County Attorney, Chris Keller; Deputy County Attorney, Cedric Hay and Assistant to the Clerk of the Board, Diane Gardner.

1:34 P.M. – Motion was made by Supervisor Smith and seconded by Supervisor House to adjourn from executive session. Motion carried by unanimous vote.

Chairwoman Chase adjourned the meeting at 1:35 P.M. The next regular meeting of the Pinal County Board of Supervisors will be on Wednesday, November 4, 2015 at 9:30 A.M.

PINAL COUNTY BOARD OF SUPERVISORS

Diane Gardner

Diane Gardner, Assistant to the Clerk of the Board

Public Hearing

Fugitive Dust Rule

Rulemaking Timeline and Status

- Held formative stakeholder meetings
- Proposed rule published in Az. Admin. Register 8/28/2015
- Held general stakeholder meeting 9/1/2015
- Held oral proceeding 9/28/2015
- 30 day public comment period closed 9/28/2015
- Comments received from SRP
- Board Work Session 10/21/2015

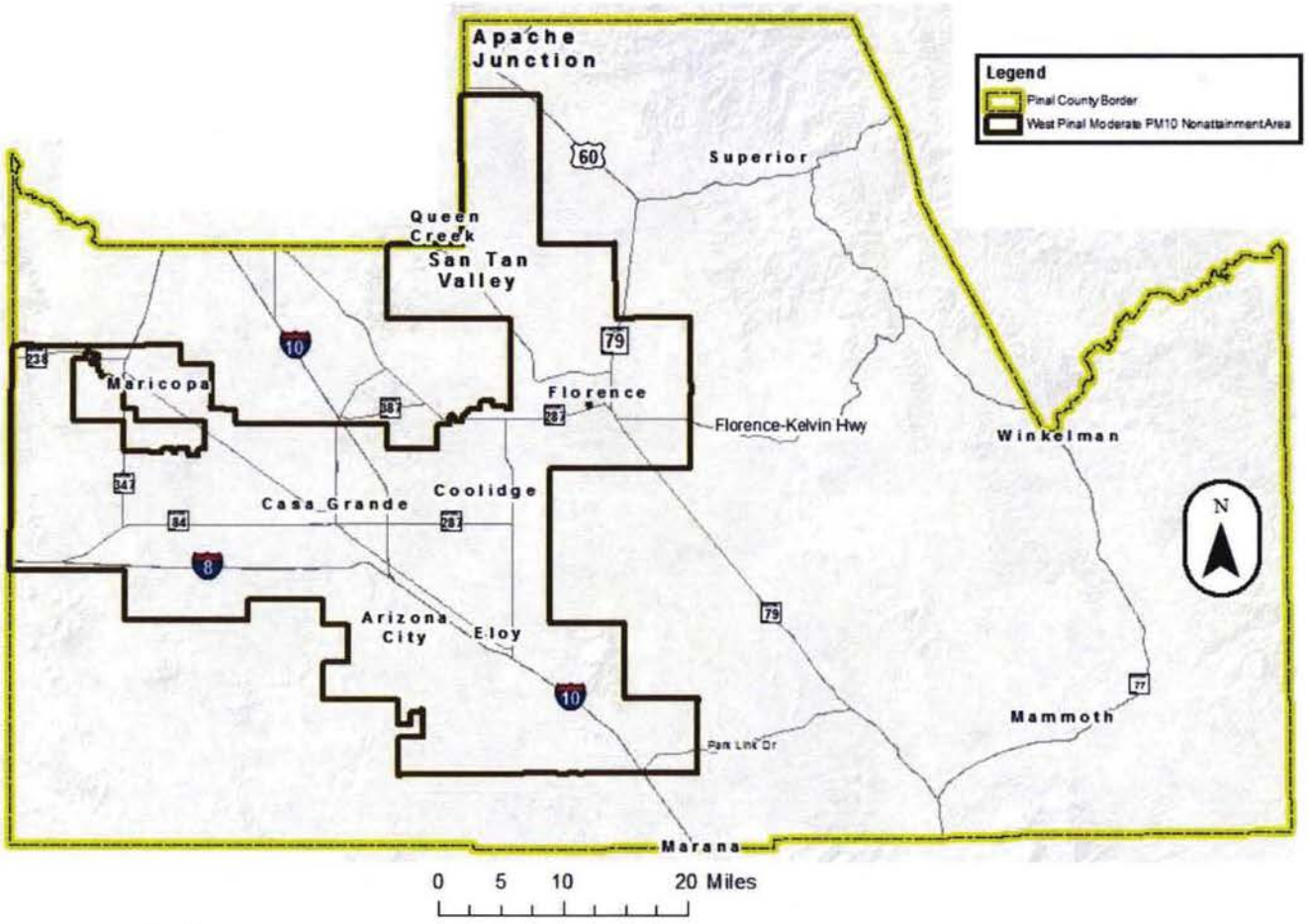
Open Areas/Vacant Lots

- Open Areas/Vacant Lots
  - 20% opacity limit
  - Addresses trespass
  - Stabilization requirements 1 acre or larger with 0.5 acres or more of disturbed surface
  - Stabilization for weed or vegetation removal
- Unpaved Lots >5,000 ft^2
  - 20% opacity limit and silt content limit
  - Apply water or dust suppressants, gravel, or pave
- Public unpaved roads with greater than 150 ADT
  - 20% opacity limit and silt content limit
  - Annual treatment requirement of 15 miles
- Paved Public Roadway
  - Track-out removal & road shoulder stabilization requirements

Resolution

- The resolution adopts the Fugitive Dust rule
- Directs Air Quality to request that ADEQ submit the rules to EPA for inclusion in the Sate Implementation Plan

West Pinal PM_{10} Nonattainment Area



10/19/2015

PINAL • COUNTY
Wide open opportunity

AGENDA ITEM

October 28, 2015
ADMINISTRATION BUILDING A
FLORENCE, ARIZONA

APPROVED this 28th day of Oct 20 15
Cheryl Chase
Chairman, Pinal County Board of Supervisors
ATTEST Diane Zaragoza
CLERK

REQUESTED BY: Mike Sundblom/Greg Stanley

Funds #: 86

Dept. #: 3140180

Dept. Name: Air Quality

Director: Michael Sundblom

BRIEF DESCRIPTION OF AGENDA ITEM AND REQUESTED BOARD ACTION:

Public Hearing and discussion/approval/disapproval of Resolution No. 102815-AQ2, a resolution pursuant to Title 49 of the Arizona Revised Statutes, adopting proposed changes to local air quality rules. The changes pertain to the West Pinal PM10 Moderate Nonattainment Area and involve establishing "reasonable available control measures" or "RACM" for PM10 generated from unpaved lots, open area/vacant lots, and paved and unpaved roads. If approved, the proposed changes will be submitted to the Environmental Protection Agency through the Arizona Department of Environmental Quality as elements of the Arizona State Implementation Plan. Required notices have been published, posted and e-mailed, and the full text of the proposed changes was published in the Arizona Administrative Register on August 28, 2015. The Board may choose to adopt the resolution, approving all, part or none of the proposed changes.

BRIEF DESCRIPTION OF THE FISCAL CONSIDERATIONS AND/OR EXPECTED FISCAL IMPACT OF THIS AGENDA ITEM:

BRIEF DESCRIPTION OF THE EXPECTED PERFORMANCE IMPACT OF THIS AGENDA ITEM:

MOTION:

Approve Resolution No. 082615-AQ2

History

Time	Who	Approval
10/22/2015 8:30 AM	County Attorney	Yes
10/22/2015 8:30 AM	Air Quality	Yes
10/22/2015 11:05 AM	County Manager	Yes
10/22/2015 2:06 PM	Clerk of the Board	Yes

ATTACHMENTS:

Click to download

- Resolution
- Concise Explanatory Statement

When recorded return to:
Clerk of the Board
Pinal County
P.O. Box 827
Florence, Arizona 85232

PINAL COUNTY BOARD OF SUPERVISORS
RESOLUTION NO. 102815-AQ2
PINAL COUNTY AIR QUALITY CONTROL DISTRICT

A RESOLUTION OF THE BOARD OF SUPERVISORS OF PINAL COUNTY, ADOPTING CERTAIN REVISIONS TO THE PINAL COUNTY AIR QUALITY CONTROL DISTRICT RULES AND REQUESTING THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY SUBMIT THE REVISIONS TO THE ENVIRONMENTAL PROTECTION AGENCY AS AN ELEMENT OF THE ARIZONA STATE IMPLEMENTATION PLAN.

WHEREAS, the Pinal County Board of Supervisors ("Board") is empowered under A.R.S. §49-479 to adopt rules for the purpose of controlling the release of air contaminants within the County;

WHEREAS, ongoing PM_{10} exceedances in Pinal County resulted in a July 2, 2012 Environmental Protection Agency (EPA) redesignation from attainment to nonattainment for a large portion of central and western Pinal County (West Pinal Moderate PM_{10} Nonattainment Area – defined in 40 CFR 81.303).;

WHEREAS, the base year (2008) PM_{10} emissions inventory for the West Pinal PM_{10} Nonattainment Area quantified general fugitive emissions as a significant source category;

WHEREAS, Clean Air Act requirements (§172(c)) include developing control measures that reduce emissions from significant source categories;

WHEREAS, Pinal County in coordination with stakeholders, EPA and Arizona Department of Environmental Quality (ADEQ) developed a West Pinal PM_{10} Nonattainment area general fugitive dust rule that provides the necessary control measures to reduce PM_{10} emissions attributed to windblown dust and unpaved roads;

WHEREAS, to the extent applicable, the District has complied with the notice-publication and other public notification requirements of A.R.S. §§49-471.04 and 49-479, and 40 C.F.R. §51-102, including a combined notice of proposed rulemaking and oral proceeding published at 21 A.A.R. 1730 (8/28/15);

WHEREAS, the elements of the final proposed changes in the County's air quality rules are set forth below in full;

THEREFORE, FOR THE PURPOSE OF PROTECTING AND PRESERVING THE QUALITY OF AIR WITHIN THE COUNTY IN A SENSIBLE AND ORDERLY MANNER, IT IS HEREBY RESOLVED BY THE BOARD TO:

1. **Adopt the following revisions, additions and deletions to the Pinal County Air Quality Control District Code of Regulations, the full text of which follows the indicated field markers.**
2. **Direct Pinal County Air Quality to submit the adopted rules (excluding §1-1-105) to the Arizona Department of Environmental Quality (ADEQ) with the request that they be submitted to the Environmental Protection Agency (EPA) for inclusion in the Arizona State Implementation Plan (SIP).**

***

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).

h. Article 8. (As amended 5/18/05, as amended 1/7/09).

3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:
1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:
1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or

7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~
WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C. , Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.

a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.

9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule,

maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

   A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.
   B. The owner and/or operator shall implement applicable control measures.
   C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.
   D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

i. Apply and maintain water or dust suppressants; or
ii. Establish vegetation; or
iii. Install and maintain pavement; or
iv. Apply and maintain gravel uniformly; or
v. Apply and maintain chemical/organic stabilizers/suppressants; or
vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.
i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.
iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or
ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or
iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or
iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or
v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES:**

a. Pave; or
b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or
c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or
d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal

to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES:**

a. Pave; or
b. Apply and maintain dust suppressants other than water; or
c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and
2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

   i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)
      a. Manually sweeping and picking up; or
      b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
      c. Operating a PM10 efficient street sweeper; or
      d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

   ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

   iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.
   ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.
B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
   i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.
   ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

IN WITNESS WHEREOF, the undersigned, in accord with the vote of the Pinal County Board of Supervisors as duly reflected in the minutes of the Board meeting, have executed this document on behalf of the Board of Supervisors on this 28th day of October 2015.

PINAL COUNTY, a political subdivision of the State of Arizona,

By: Cheryl Close
Chairwoman of the Board of Supervisors

ATTEST: Deana Gardner
assistant Clerk of the Board of Supervisors

THE SEAL OF PINAL COUNTY ARIZONA 1875

APPROVED AS TO FORM:

Lando Voyles
Pinal County Attorney

By:
Deputy County Attorney

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SECRETARY OF STATE

2015 OCT 30 AM 10: 33

FILED

AGENCY RECEIPT

NOTICE OF FINAL RULEMAKING

This receipt accompanies hard-copies and disk publication submittals entitled:

a. Agency name: Pinal County Air Quality Control District
P.O. Box 987
Florence, Arizona 85132
(520)866-6929
(520)866-6967 FAX

b. "NOTICE OF FINAL RULEMAKING" which is intended for publication on November 20, 2015.

The adopted revisions to local air quality rules involve the following:

§1-1-105 SIP List ..... Amend
§4-1-010. Adopted document(s) ..... Amend
§4-1-015. Exemptions ..... New
§4-1-020. Definitions ..... New
§4-1-030. Standards ..... New
§4-1-040. Recordkeeping ..... New
§4-1-045. Reporting Requirements ..... New
§4-1-050. Records Retention ..... New
§4-1-060. Violations ..... New

Pinal County Air Quality Control District

P. O. Box 987
Florence, Arizona 85132

(520) 866-6929 Fax: (520) 866-6967

SECRETARY OF STATE
2015 OCT 30 AM 10: 33
FILED

Intended for Publication on November 20, 2015

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING
PURSUANT TO A.R.S. §49-471.01 *et seq.*

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The adopted rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These adopted general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions for the aforementioned land use categories. In addition the adopted rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The Pinal County Board of Supervisors adopted the proposed additions and amendments listed in section B below at their October 28, 2015 meeting.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	**Rulemaking Action**
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Amendment of Chapter 4, Article 1, §010,
    - Amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.
3. Addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:

- Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
- Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
- Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
- Dust generating operations (i.e. construction).
- Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.

4. Addition of Chapter 4, Article 1, §020 (Definitions),
    - Sixteen definitions directly related to these rules.
5. Addition of Chapter 4, Article 1, §030 (Standards)
    - Subsection 1 – General requirements
        A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.
        B. The owner and/or operator shall implement applicable control measures.
        C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.
        D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.
    - Subsection 2 – Open areas/vacant lots
        A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
        B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
        C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.
        D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.
        E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.
        F. Compliance determination.

- Subsection 3- Unpaved lots
    - A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
    - B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.
- Subsection 4 – Unpaved roads
    - A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
    - B. Control measures are considered effectively implemented when:
        - i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
            - a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
                - i. Done on unpaved roads previously untreated, and
                - ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
        - iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.
- Subsection 5 – Paved public roadway
    - A. Trackout cleanup provisions for trackout that extends 50 feet or more.
        - i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
        - ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
        - iii. Trackout cleanup extension provision
    - B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of

application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Addition of Chapter 4, Article 1, §050 (Records retention)

   Two year records retention requirement.

8. Addition of Chapter 4, Article 1, §060 (Violations)

   Violation provisions for these rules.

   Violation exemptions include:

   i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.
   ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

Open areas/Vacant lots

There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the adopted 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the adopted 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The adopted rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to

the surface area disturbed prior to, during and after the weed abatement. The adopted rules include additional trackout requirements associated with weed abatement activities. All of these new adopted restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold adopted (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the adopted rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection 4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road is $100,000 per mile. Assuming the 15 miles per year requirement in §4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the adopted rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper.

In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The adopted rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987
Florence, AZ. 85132

http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the adopted rules:

Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1730, August 28, 2015.

Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1731, August, 28, 2015

2. The full text of the adopted changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii. §4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly

exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:

1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:

1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*

18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~
WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C. , Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.

4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES- as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY - as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.
6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE - As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any

non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.

8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
    a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
    b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
    c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
        i) Wind speed and direction,
        ii) Stagnation,
        iii) Recent precipitation, and
        iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.

13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.

15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.
16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. **GENERAL REQUIREMENTS**

A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.
B. The owner and/or operator shall implement applicable control measures.
C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.
D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. **OPEN AREAS/VACANT LOTS**

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:
   i. No trespassing signs
   ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

i. Apply and maintain water or dust suppressants; or
ii. Establish vegetation; or
iii. Install and maintain pavement; or
iv. Apply and maintain gravel uniformly; or
v. Apply and maintain chemical/organic stabilizers/suppressants; or
vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.
   i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.
   ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.
   iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:
   i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or
   ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or
   iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or
   iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or
   v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8% ;

ii. **CONTROL MEASURES:**

a. Pave; or
b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or
c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or
d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES:**

a. Pave; or

b. Apply and maintain dust suppressants other than water; or
c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:
   i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.
      a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:
         1. Done on unpaved roads previously untreated, and
         2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.
   ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:

In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.

10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

   i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from

traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)

a. Manually sweeping and picking up; or
b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
c. Operating a PM10 efficient street sweeper; or
d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.
ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.
B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:
   i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.
   ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

COUNTY NOTICES ACCORDING TO A.R.S. § 49-112

This section of the *Arizona Administrative Register* contains County Notices (according to A.R.S. § 49-112).

Each county writes rules and regulations in its own unique style. Although these notices are published in the *Register*, they do not conform to the standards specified in the *Arizona Rulemaking Manual*. With the exception of minor formatting changes, County Notices (including subsection labeling, spelling, grammar, and punctuation) are reproduced as submitted.

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING

PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-289]

1. **Preamble**

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area were windblown dust (53%), unpaved roads (32%) and construction (9%).

Windblown PM_{10} emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by activities impacted by windy conditions that result in PM_{10} emissions). There are a number of land use categories associated with windblown PM_{10} emissions, including open areas/vacant lands, unpaved roads and unpaved parking lots. The unpaved roads PM_{10} emissions associated with PM_{10} exceedances in the nonattainment area occur under both windblown and stagnation conditions. The adopted rules include standards (opacity, stabilization) which are designed to limit unpaved roads emissions under both windblown and stagnation conditions.

These adopted general fugitive dust rules include opacity and ground stabilization standards which limit PM_{10} emissions attributed to both stagnation and windy conditions for the aforementioned land use categories. In addition the adopted rules provide recordkeeping requirements that ensure verification by PCAQCD, ADEQ and EPA.

The Pinal County Board of Supervisors adopted the proposed additions and amendments listed in section B below at their October 28, 2015 meeting.

The adopted amended and new rules are identified below and include an amendment to §1-1-105 with the ultimate purpose of this rulemaking being the submittal of the adopted rules in Chapter 4, Article 1, as elements of the Arizona State Implementation Plan (SIP) as required under the Clean Air Act (CAA).

B. All of the adopted corresponding changes are discussed in subsection E. of this preamble, and include the following sections:

Section Affected	Rulemaking Action
§1-1-105. SIP List	Amend
§4-1-010. Adopted document(s)	Amend
§4-1-015. Exemptions	New
§4-1-020. Definitions	New
§4-1-030. Standards	New
§4-1-040. Recordkeeping	New
§4-1-045. Reporting Requirements	New
§4-1-050. Records Retention	New
§4-1-060. Violations	New

C. Those wishing further information regarding any aspect of this rulemaking may contact Scott DiBiase, Pinal County Air Quality, 31 North Pinal St., Building F, Florence, Arizona, 85132, 520-866-6929, scott.dibiase@pinalcountyaz.gov.

D. The rule making process consisted of the initial administrative rule development process, including the combined notice of proposed rulemaking and oral proceeding, a 30 day public comment period, and an oral proceeding before the Control Officer or his designee on September 28, 2015. Written comments were due prior to the close of the comment period, which was the close-of-business on the day of the oral proceeding. The final step in the rule adoption process was a hearing before the Board of Supervisors on October 28, 2015.

E. The adopted revisions include the following:

1. §1-1-105 – Addition of Chapter 4, Article 1 and its adoption date to Section 1-1-105 which is a list designating which rules (and their corresponding adoption dates) are to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP
2. Amendment of Chapter 4, Article 1, §010,
   - Amendment of the section titled "Adopted document(s)" by replacement of title with the new title "General Applicability". Removal of the original language which adopted ADEQ rules (Title 18, Chapter 2, Article 6) by reference and replacement with the purpose of the general fugitive dust rules, effective date and geographic scope of the rules.
3. Addition of new section (§4-1-015. Exemptions) which define the exemptions to the new general fugitive dust rules, including the following:
   - Vehicle test and development facilities and operations where dust is required to test and validate the design integrity, product quality and/or commercial acceptance of the product(s).
   - Emergency response activities that address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God.
   - Normal farm cultural practices with reference to the Arizona Revised Statutes that define what normal farm cultural practices are and the ADEQ rules that regulate them.
   - Dust generating operations (i.e. construction).
   - Establishment of initial landscapes without use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports.
4. Addition of Chapter 4, Article 1, §020 (Definitions),
   - Sixteen definitions directly related to these rules.
5. Addition of Chapter 4, Article 1, §030 (Standards)
   - Subsection 1 – General requirements
     - A. The owner and/or operator of several land use categories (open areas/vacant lots, unpaved commercial lots, unpaved roads and paved public roadways) shall be

subject to the standards and/or requirements in the rule. Failure to do so is deemed a violation.

B. The owner and/or operator shall implement applicable control measures.

C. The control measures are implemented to meet the visible emissions and stabilization requirements along with compliance determinations for each applicable category.

D. Failure to implement control measures and/or failure to maintain stabilization requirements is deemed a violation of this rule.

- Subsection 2 – Open areas/vacant lots
  - A. Visible emissions and stabilization requirements – 20% opacity limit for fugitive dust emissions on the property.
  - B. When trespass takes place in open areas/vacant lots, the owner and/or operator shall install and maintain either no trespassing signs or physical barriers (i.e. curbs, fences, gates, etc.).
  - C. Surface stabilization requirement for open areas/vacant lots 1.0 acre or larger that have 0.5 acre or more of disturbed surface area with control measures listed.
  - D. Within thirty days following discovery of disturbed surface areas (0.5+ acre for open areas/vacant lots 1.0+ acre) in open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County Dust Control Forecast. The owner and/operator shall ensure their respective open area/vacant lot is stabilized the day leading up to and day of high risk forecast.
  - E. Open areas/vacant lots stabilization and trackout requirements for vegetation removal.
  - F. Compliance determination.
- Subsection 3 – Unpaved lots
  - A. Visible emissions and stabilization requirements for unpaved lots (5,000+ ft^2 in size) including control measures.
  - B. Control measures shall be considered effectively implemented when the unpaved lot meets the opacity and stabilization requirements.
- Subsection 4 – Unpaved roads
  - A. Unpaved roads with Average Daily Traffic (ADT) greater than 150 are subject to the opacity (20%) and stabilization (silt loading or silt content) standards and need to implement one of the control measures (i.e. pave, dust suppressants, gravel)
  - B. Control measures are considered effectively implemented when:
    - i. One of the control measures is implemented on 15 miles per year of unpaved roads having ADT great than 150.
      - a. When the control measure is the application/maintenance of dust suppressants, it will only count towards the 15 miles per year requirement when,
        - i. Done on unpaved roads previously untreated, and
        - ii. Dust suppressant application/maintenance of unpaved road previously treated continues annually until the unpaved road is paved.
        - iii. For year 2019 and beyond, the mileage equivalency method for determining the number of miles of unpaved roads with ADT less than 150 that have control measures applied on them when compared to public unpaved roads with ADT greater than 150. The equivalency method is used to determine compliance with the 15 miles per year stabilization requirement of public unpaved roads with ADT great than 150 to those public unpaved roads that have ADT less than 150 and are treated by control measures.
- Subsection 5 – Paved public roadway
  - A. Trackout cleanup provisions for trackout that extends 50 feet or more.
    - i. Within 24 hours of discovery, remove the trackout with one of the control measures listed.
    - ii. During removal of trackout, do so in a manner that doesn't cause another source of fugitive dust.
    - iii. Trackout cleanup extension provision

B. Stabilization and trackout provisions for work done on unpaved shoulders adjacent to paved public roadways.

6. Addition of Chapter 4, Article 1, §040 (Recordkeeping)

Recordkeeping requirements for any person subject to the rules including records of control measure application, date(s) of application. Records should be provided within 48 hours of request by control officer. However records should be provided without delay if the control officer is at the location where the records are kept.

7. Addition of Chapter 4, Article 1, §050 (Records retention)

Two year records retention requirement.

8. Addition of Chapter 4, Article 1, §060 (Violations)

Violation provisions for these rules.

Violation exemptions include:

i. Wind conditions that cause fugitive dust to exceed the opacity standard – as long the control measures are implemented, applied and maintained and all dust contributing surface areas are stabilized.

ii. Emergency maintenance of flood control channels as long as at least one control measure is applied and maintained.

F. A reference to any study relevant to the rule that the agency reviewed and either relied on in its evaluation of or justification for the rule or did not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study (See contact information in subsection C above), all data underlying each study, and any analysis of each study and other supporting material:

Draft ADEQ document "Pinal PM_{10} Emission Inventories and Source Apportionment Modeling Results".

G. Economic, small business and consumer impact statement

Open areas/Vacant lots

There are currently no estimated costs to owners and/or operators of open areas/vacant lots that may be potentially affected by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the ownership for parcels classified as open areas/vacant lots and the subset of them that exceed the adopted 1.0 acre or larger threshold. For those open areas/vacant lots that do reach the adopted 1 acre threshold, there may be some incremental costs associated with determining stability at their respective open area/vacant lot. Additionally, if there is evidence of trespass the owner and/or operator of the open area/vacant lot will be required to either install no trespassing signs or physical barriers. The size of the open area/vacant lot and control measure chosen by the owner and/or operator will determine the additional incremental costs potentially affecting them.

The adopted rules include new restrictions on owners and/or operators that choose to remove vegetation from their lots. The restrictions include applying a dust suppressant to the surface area disturbed prior to, during and after the weed abatement. The adopted rules include additional trackout requirements associated with weed abatement activities. All of these new adopted restrictions will add to the incremental costs associated with owners and/or operators of open area.

Unpaved Lots

Currently there are no estimated costs to potentially affected parties of unpaved lots by the adopted general fugitive dust rules. PCAQCD is in the process of assessing the extent of the parcels that have unpaved lots greater than the size threshold adopted (5,000 square feet). For those unpaved lots that do exceed the 5,000 square foot threshold, there may be some incremental costs associated with determining stability at their respective unpaved lot. If the stability of the unpaved lots needs to be addressed, there will be additional costs by the owner and/ operator to stabilize by use of one of the following control measures (paving, applying dust suppressants, applying gravel or an alternative control measure).

Unpaved Roads

The regulated community in the adopted rules for unpaved public roads includes Pinal County, Casa Grande, Maricopa, Florence, Coolidge, Eloy and Queen Creek. The requirements in §4-1-030.4, in particular subsection

4.B.ii will add significant costs to the regulated communities. The application of control measures on 15 miles per year of unpaved roads are in addition to what's already in the 2016-2018 Transportation Improvement Program (TIP). The TIP is a five year plan of transportation projects for each entity that includes projects such as application of dust suppressants to unpaved roads, chip-seal and paving projects, etc. Therefore the requirement to apply control measures on an additional 15 miles per year of public unpaved roads has significant economic and fiscal impact to the regulated community. The approximate cost to chip-seal an average 28 foot wide unpaved road is $100,000 per mile. Assuming the 15 miles per year requirement in §4-1-030.4.B.ii were accomplished by chip sealing then the added economic impact to the regulated community would be approximately $1.5 million per year. The regulated community does have other control measures available including application of dust suppressants. However in order to be counted towards the 15 miles per year requirement, the regulated entity that does use dust suppressant will be required to do so on a public unpaved road not previously treated and continue application and maintenance of the dust suppressant on that particular road until it is eventually paved.

Paved Public Roadways

The trackout requirements in the adopted rules (§4-1-030.5) will create incremental costs to the regulated entities. However current business practice by most of the regulated community is to address cleanup of trackout by conducting street sweeping on the offending portion of the paved road. Several of the street sweepers in the West Pinal PM_{10} nonattainment area are PM_{10} efficient street sweepers. The PM_{10} efficient street sweepers are typically purchased through the Congestion Mitigation and Air Quality (CMAQ) process which includes a requirement for the local agency to match a certain percentage of the cost of the street sweeper. In this case the local match requirement for CMAQ funding is 5.7% which is approximate $13,500 per PM_{10} efficient street sweeper. In addition, labor costs associated with each street sweeper for maintenance and operation is ongoing.

The adopted rules also include stabilization requirements for work done on unpaved shoulders. The stabilization requirements (application of dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency) associated with any work done on unpaved shoulders will also add incremental costs to the regulated universe. There is also a trackout provision attributed to the treatment of unpaved shoulders which will require the application of a dust suppressant but also potentially the use of a PM_{10} efficient street sweeper.

Pinal County

The estimated costs for PCAQCD are those that accrue from development, implementation and enforcement of the new standards. PCAQCD has an ongoing internal assessment of the costs associated with implementation and enforcement of its permitting, administration and field services activities associated with dust (construction fugitive dust and general fugitive dust) and open burning. Future rulemaking proposals will include estimates on the costs associated with these various programs and if needed, any proposed changes to associated dust and open burning permit fees.

H. The adopted changes will take effect January 1, 2016.

I. Compliance with the Fee-limitations of A.R.S. §49-112 (A) or (B).

Based on information and belief, the Director of the Pinal County Air Quality Control District affirms the following:

Initially, the total of the fees and other charges currently assessed in connection with the administration of the County's air quality program do not now equal the cost of program administration. To the extent that both the County and ADEQ impose parallel fees, the County's fees are capped by rule at ADEQ's rates, which implicitly affirms that the County's fees are reasonable. To the extent the County's program affects certain sources that ADEQ either does not regulate or does not charge, these adopted changes do not impose any additional fees on those sources at this time.

J. Persons may obtain a full copy of the adopted rules or existing rules at:

Pinal County Air Quality Control District
31 North Pinal St., Building F.
P.O. Box 987

Florence, AZ. 85132
http://www.pinalcountyaz.gov/AirQuality/Pages/home.aspx

K. A list of all previous notices appearing in the Register addressing the adopted rules:
Notice of Rulemaking Docket Opening: 21 A.A.R. 35, 1730, August 28, 2015.
Combined Notice of Proposed Rulemaking and Notice of Oral Proceeding: 21 A.A.R. 35, 1731, August, 28, 2015

2. The full text of the adopted changes follows:

1-1-105. SIP list

A. As a declaration of Board policy rather than a rule, and subject to the limitations of paragraphs B. and C. of this section, the Board of Supervisors expressly designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP:

1. Chapter 1
   a. Article 1.(As amended 5/14/97 and 5/27/98), except for §§1-1-105 and 1-1-107.
   b. Article 2 (As amended 5/14/97 and 7/12/00) except for §1-2-110.
   c. Article 3. (As amended 5/14/97, 5/27/98 and 10/27/04, 07/23/14, except for §1-3-130 and the definition in §1-3-140.82 (10/12/95) of "maximum achievable control technology.")
2. Chapter 2
   a. Article 1. (As amended 10/12/95).
   b. Article 2. (As amended 5/14/97).
   c. Article 3. (As amended 10/12/95).
   d. Article 4. (As amended 10/12/95).
   e. Article 5. (As amended 10/12/95).
   f. Article 6. (As amended 10/12/95).
   g. Article 7. (As amended 10/12/95).
   h. Article 8. (As amended 5/18/05, as amended 1/7/09).
3. Chapter 3
   a. Article 1. (As amended 5/14/97, and 5/27/98 and 7/12/00), excluding:
      i. §3-1-020
      ii. §3-1-045
      iii. §3-1-080
      iv. §3-1-100
   b. Article 2. (As amended 10/12/95, 5/27/98 and 7/29/98).
   c. Article 3. (As amended 10/12/95, 5/27/15).
   d. Article 8. (As amended 10/12/95 and 10/27/04).
4. Chapter 4
   a. Article 1. (As amended 2/22/95, 10/28/15).
   b. Article 2. (As amended 5/14/97, 7/12/00, 12/4/02 and 10/27/04).
   c. Reserved.
   d. Article 4 (As amended 6/3/09).
   e. Article 5 (As amended 6/3/09).
   f. Reserved.
   g. Article 7 (As amended 6/3/09)
   h. Reserved.
   i. Article 9, limited to:
      i. §4-9-320 (As amended 6/3/09)
      ii.§4-9-340 (As amended 6/3/09)

B. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, those provisions, save §3-1-084 which shall be expressly exempted from the limitation of this paragraph, shall operate as elements of the SIP only insofar as they pertain to:

1. "construction," as defined in Nov. '93 Code §1-3-140.28; or
2. "modification," as defined in Nov. '93 Code §1-3-140.85; and

C. Notwithstanding the approval as elements of the SIP of those provisions of the Code identified in paragraph A of this section, neither those provisions nor any permit conditions imposed pursuant to those provisions shall:

1. Operate as elements of the SIP insofar as they pertain to other than "conventional pollutants," as defined in §1-3-140.33;
2. Operate as elements of the SIP insofar as they pertain only to a requirement arising under, or pertain to a source subject to regulation exclusively by virtue of a requirement arising under:
   a. §111 of the Clean Air Act; or
   b. Title IV of the 1990 amendments to the Clean Air Act; or
   c. Title VI of the 1990 amendments to the Clean Air Act; or
   d. Any section of this Code that is not a part of the SIP;
3. Operate as an element of the SIP, at least insofar as they impose a "fee";
4. Operate as an element of the SIP, at least insofar as they require a "certification";
5. Operate as an element of the SIP, at least insofar as they impose obligations pertaining to "renewals";
6. Operate as an element of the SIP, at least insofar as they impose requirements regarding "excess emissions"; or
7. Operate as an element of the SIP, at least insofar as they impose requirements regarding "compliance plans."

D. As a renumbering and reconciliation of previously approved SIP provisions as elements of this Code, the Board of Supervisors additionally designates the following list of sections within this Code, to be presented to the Governor of Arizona for transmittal to the Administrator of the EPA with a request that they be included as elements in the Arizona SIP without operational limitation:

1. §§1-1-010.C (2/22/95) and 1-1-010.D (2/22/95) *Declaration of Policy*
2. Chapter 2, Article 8 (As amended 1/7/09) *Visibility Limiting Standard*
3. Chapter 3, Article 8 (2/22/95) *Open Burning*
4. [Reserved]
5. [Reserved]
6. [Reserved]
7. [Reserved]
8. [Reserved]
9. [Reserved]
10. [Reserved]
11. [Reserved]
12. §5-18-740 (2/22/95) *Storage of Organic Compounds - Organic Compound Emissions*
13. §5-19-800 (2/22/95) *Loading of Volatile Organic Compounds - Organic Compound Emissions*
14. §5-21-920 (2/22/95) *Fossil Fuel Fired Industrial and Commercial Equipment Standard Applicability*
15. §5-21-930 (2/22/95 and 7/12/00) *Fossil Fuel Fired Industrial and Commercial Equipment Particulate Emission Standard*
16. §5-22-950 (2/22/95) *Fossil Fuel Fired Steam Generator Standard Applicability*
17. §5-22-960 (2/22/95) *Fossil Fuel Fired Steam Generator Sulfur Dioxide Emission Limitation*
18. §5-24-1030.F (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Organic Compound Emissions*
19. §5-24-1030.I (2/22/95) *Generally Applicable Federally Enforceable Minimum Standard of Performance - Carbon Monoxide*
20. §5-24-1032 (2/22/95) *Federally Enforceable Minimum Standard of Performance - Process Particulate Emissions*
21. §5-24-1040 (2/22/95) *Carbon Monoxide Emissions - Industrial Processes*
22. §5-24-1045 (2/22/95) *Sulfite Pulp Mills - Sulfur Compound Emissions*
23. §5-24-1050 (2/22/95, as amended June 20, 1996) *Reduced Sulfur Emissions - Default Limitation*
24. §5-24-1055 (2/22/95) *Pumps and Compressors - Organic Compound Emissions*

ARTICLE 1. ~~ADOPTED DOCUMENTS~~

WEST PINAL PM10 MODERATE NONATTAINMENT AREA FUGITIVE DUST

4-1-010. ~~Adopted document(s)~~ General Applicability

~~A.A.C. , Title 18, Chapter 2, Article 6 is hereby adopted by reference and made a part of this Code.~~

1. The purpose of this Article is to control fugitive dust from open areas /vacant lots, unpaved roads, unpaved lots and paved public roadways by requiring measures to prevent, reduce or mitigate fugitive dust emissions.
2. Effective Date
   The rules in this Article will become effective on January 1, 2016.
3. Geographic Scope
   The rules in this Article shall be effective throughout the West Pinal County PM_{10} Moderate Nonattainment area as defined in 40 CFR Part 81.303.

4-1-015. Exemptions

1. In the case of legitimate vehicle test and development facilities and operations conducted by or for an equipment manufacturer, where dust is required to test and validate the design integrity, product quality and/or commercial acceptance, those specific activities shall be exempt from the applicable standards and requirements in this Article.
2. The standards and requirements of this Article shall not apply to emergency response activities that may disturb the soil conducted by any utility or government agency in order to prevent public injury or to restore critical utilities to functional status. For purposes of this subsection, an emergency response must address a situation arising from a sudden and unforeseeable event beyond the control of the owner and/or operator, including acts of God. Activities by an owner and/or operator to address a disturbance resulting from improperly designed equipment, lack of preventative maintenance, careless or improper operation or operator error shall not qualify as an emergency response.
3. The standards and requirements of this Article shall not apply to normal farm cultural practices according to A.R.S. §49-457 and A.R.S. §49-504.4 which are subject to Arizona Department of Environmental Quality (ADEQ) rules R18-2-610, R18-2-610.01, R18-2-611 and R18-2-611.01.
4. The standards and requirements of this Article shall not apply to dust generating operations subject to the standards and/or requirements described in Chapter 4, Article 3.
5. The standards and requirements of this Article shall not apply to the establishment of initial landscapes without the use of mechanized equipment, conducting landscape maintenance without the use of mechanized equipment, and playing on or maintaining a field used for non-motorized sports. However, establishing initial landscapes without the use of mechanized equipment and conducting landscape maintenance without the use of mechanized equipment shall not include grading, or trenching, performed to establish initial landscapes or to redesign existing landscapes.

4-1-020. Definitions

For the purpose of this Article, the following definitions shall apply:

1. ADT (Average Daily Trips) – As used in this Article, means the average number of vehicles that cross a given point surface during a specific 24-hour period as determined by the most recent Institute of Transportation Engineers trip generation manual, tube counts, or observations.
2. CONTROL MEASURES – as used in this Article means, a preemptive or concurrent technique used to minimize the generation, emission, entrainment, suspension, and/or airborne transport of fugitive dust in order to comply with applicable standards.
3. DISTURBED SURFACE AREA – As used in this Article, means any portion of the earth's surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition.
4. DUST SUPPRESSANT – As used in this Article, means water, hygroscopic material, solution of water and chemical surfactant foam, non-toxic chemical stabilizer or any other dust palliative, which is not prohibited by the U. S. Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ), or any applicable law, rule, or regulation, as a treatment material for reducing fugitive dust emissions.
5. EMERGENCY – as used in this Article means a situation arising from sudden and reasonably unforeseeable events beyond the control of the owner and/or operator, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the associated activities to exceed a limitation in this rule, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include any noncompliance due to improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

6. FUGITIVE DUST – As used in this Article, means the regulated particulate matter, which is not collected by a capture system, which is entrained in the ambient air, and which is caused from human and/or natural activities, such as but not limited to, movement of soils, vehicles, equipment, blasting, and wind. For the purpose of this rule, fugitive dust does not include particulate matter emitted directly from the exhaust of motor vehicles and other internal combustion engines, from portable brazing, soldering, or welding equipment, and from piledrivers.
7. MOTOR VEHICLE – As used in this Article, means a self-propelled vehicle for use on the public roads and highways of the State of Arizona and required to be registered under the Arizona State Uniform motor vehicle Act, including any non-motorized attachments, such as but not limited to, trailers and other conveyances which are connected to or propelled by the actual motorized portion of the vehicle.
8. OPEN AREAS/VACANT LOTS – As used in this Article, means any of the following described in Subsections a through c below. For the purposes of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are considered one open area.
   a. An unsubdivided or undeveloped land whether or not it is adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.
   b. A subdivided residential, industrial, institutional, governmental, or commercial lot that contains no approved or permitted buildings or structures of a temporary or permanent nature.
   c. A partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.
9. OWNER AND/OR OPERATOR – As used in this Article, means any person including, but not limited to, the property owner, lessee or responsible official.
10. PAVE – As used in this Article, to apply and maintain asphalt, concrete, or other similar material to a roadway surface, such as asphaltic concrete, concrete pavement, chip seal, or rubberized asphalt.
11. PAVED PUBLIC ROADWAY – As used in this Article, means a publicly owned paved roadway, owned by federal, state, county, municipal, or other government or quasi-governmental agencies as evidenced by a formal acceptance by the state or a political subdivision of the state of either:
    a. An on-going maintenance obligation for the roadway; or
    b. A title or easement for the roadway.
12. PINAL COUNTY DUST CONTROL FORECAST as used in this Article, means a forecast, which shall identify a low, moderate or high risk of dust generation for the next five consecutive days and shall be issued by noon on each day the forecast is generated. When developing these forecasts, the Department of Environmental Quality shall consider all of the following:
    a. Projected meteorological conditions, including:
       i) Wind speed and direction,
       ii) Stagnation,
       iii) Recent precipitation, and
       iv) Potential for precipitation;
    b. Existing concentrations of air pollution at the time of the forecast; and
    c. Historic air pollution concentrations that have been observed during meteorological conditions similar to those that are predicted to occur in the forecast.
13. STABILIZED – As used in this Article, means any previously disturbed surface area which, through the application of control measures, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust.
14. TRACKOUT – As used in this Article, any and all bulk materials that adhere to and agglomerate on the exterior surface of motor vehicles, haul trucks, and/or equipment (including tires) and that have fallen onto a paved roadway.
15. UNPAVED LOT – as used in this Article, is any area that is not paved and that is used for parking, maneuvering, material handling, or storing motor vehicles and equipment. An unpaved lot includes, but is not limited to, automobile impound yards, wrecking yards, automobile dismantling yards, salvage yards, material handling yards, and

storage yards. For the purpose of this rule, maneuvering shall not include military maneuvers or exercises conducted on federal facilities.

16. UNPAVED ROAD - as used in this Article, means any roads, equipment paths, or travel ways that are not paved. Unpaved roads are owned only by federal, state, county, municipal, or other governmental or quasi-governmental agencies. For the purposes of this Article, an unpaved road is not an agricultural road, horse trail, hiking path, bicycle path, or other similar path used exclusively for purposes other than travel by motor vehicles.

4-1-030. Standards

1. GENERAL REQUIREMENTS

A. The owner and/or operator of open areas/vacant lots, unpaved lots, unpaved roads and paved public roadways shall be subject to the standards and/or requirements described in this rule. Failure to comply with any such standards and/or requirements is deemed a violation of this rule.

B. The owner and/or operator shall implement applicable control measures.

C. Control measures shall be implemented to meet the visible emissions requirements, stabilization requirements and compliance determinations for each applicable category.

D. Failure to implement control measures as required by this rule, as applicable and/or failure to maintain stabilization in order to prevent wind erosion as measured by the requirements of this rule shall be deemed a violation of this rule.

2. OPEN AREAS/VACANT LOTS

A. **Visible Emissions and Stabilization Requirements:** The owner and/or operator of open areas/vacant lots shall not cause, suffer, allow, or permit fugitive dust emissions which result in opacity of the dust to exceed twenty percent (20%) as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator.

B. Upon evidence of trespass in open areas/vacant lots, an owner and/or operator shall install and maintain one of the following:

i. No trespassing signs

ii. Physical barriers such as curbs, fences, gates, posts, shrubs, trees, or other effective control measures to effectively prevent access to the open areas/vacant lots.

C. Owners and/or operators of open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area shall implement at least one control measure described below on the disturbed surface area in order to stabilize:

i. Apply and maintain water or dust suppressants; or

ii. Establish vegetation; or

iii. Install and maintain pavement; or

iv. Apply and maintain gravel uniformly; or

v. Apply and maintain chemical/organic stabilizers/suppressants; or

vi. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

D. For open areas/vacant lots 1.0 acre (43,560 square feet) or larger and have a cumulative of 0.5 acre (21,780 square feet) or more disturbed surface area, within 30 calendar days following the initial discovery of the disturbed surface area on the open areas/vacant lots, the owner and/or operator shall sign up to receive the Pinal County dust control forecast. The owner and/or operator shall ensure the open areas/vacant lots is stabilized the day leading up to and the day that is forecast to be high risk for dust emissions, as noticed by the Pinal County dust control forecast.

E. No person shall remove vegetation from any open areas/vacant lots by blading, disking, plowing under or any other means without implementing all of the following control measures to prevent or minimize fugitive dust.

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance immediately prior to or during the weed abatement.

ii. Prevent or eliminate material trackout onto paved surfaces and access points adjoining paved surfaces through one of the control measures in 4-1-030.5.A.i.

iii. Apply a dust suppressant(s), gravel, compaction or an alternative control measure immediately following weed abatement to the entire disturbed surface area such that the surface is stabilized.

F. Compliance with the stabilization requirement in paragraphs C, D and E shall be determined by one of the following:

i. Observation of a visible crust as determined by the drop ball test in Article 9 (§4-9-320.B.1); or

ii. A Threshold Friction Velocity (TFV), corrected for non-erodible elements, of 100 cm/second or higher as determined by the test method in Article 9 (§4-9-320.B.2); or

iii. Flat vegetation cover equal to at least 50 percent as determined by the test method in Article 9 (§4-9-320.B.3); or

iv. Standing vegetation cover equal to or greater than 30 percent as determined by the test method in Article 9 (§4-9-320.B.4); or

v. Standing vegetation cover equal to or greater than 10 percent as determined by the test method in Article 9 (§4-9-320.B.4) where threshold friction velocity, corrected for non-erodible elements, is equal to or greater than 43 cm/second.

3. UNPAVED LOTS

A. The owner and/or operator of an unpaved lot greater than 5,000 square feet in size shall be subject to the requirements described in 4-1-030.3.A.i and shall comply with at least one of the control measures described in 4-1-030.3.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of an unpaved lot shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator, and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 8%;

ii. **CONTROL MEASURES**:

a. Pave; or

b. Apply dust suppressant in sufficient quantity and frequency to maintain a stabilized surface; or

c. Apply and maintain surface gravel uniformly such that the surface is stabilized; or

d. Apply and maintain an alternative control measure approved in writing by the Control Officer and the EPA Administrator.

B. Control measure(s) in 4-1-030.3.A.ii shall be considered effectively implemented when the unpaved lot meets the requirements of 4-1-030.3.A.i.

4. UNPAVED ROADS

A. The owner and/or operator of unpaved roads with average daily trips (ADT) greater than 150 (A traffic count shall measure motor vehicle traffic over a 48-hour period, which may consist of two non-consecutive 24-hour periods. Motor vehicle traffic shall be measured continuously during each 24-hour period.) shall be subject to the requirements described in 4-1-030.4.A.i and shall comply with one of the control measures described in 4-1-030.4.A.ii:

i. **Visible Emissions Requirements and Stabilization Requirements:** The owner and/or operator of unpaved roads shall not cause or allow visible fugitive dust emissions to exceed 20% opacity as measured using an opacity method, as determined by the applicable test method in §4-9-340 or an equivalent test method approved in writing by the Control Officer and the EPA Administrator and shall not allow silt loading equal to or greater than 0.33 oz/ft^2 as determined by the applicable test method in §4-9-320.A.1. However, if silt loading is equal to or greater than 0.33 oz/ft^2, then the owner and/or operator shall not allow the silt content to exceed 6%;

ii. **CONTROL MEASURES**:

a. Pave; or

b. Apply and maintain dust suppressants other than water; or

c. Uniformly apply and maintain surface gravel

B. Control measure(s) in 4-1-030.4.A.ii shall be considered effectively implemented when:

i. One of the control measures described in 4-1-030.4.A.ii is annually implemented on 15 miles per year of unpaved roads having ADT of 150 or more.

a. When the control measure is application and maintenance of dust suppressants other than water, the application and maintenance of the dust suppressants shall only be counted towards the 15 mile threshold when:

1. Done on unpaved roads previously untreated, and
2. Application and maintenance of dust suppressants on unpaved roads previously treated continues annually until the unpaved road is paved.

ii. For year 2019 and beyond, control measures applied on unpaved roads with less than 150 ADT can be used for compliance with 4-1-030.4.B.i through use of the following equivalency conversion.

ADT Range	Mileage Equivalency (Miles of equivalent control / mileage of actual control)
0-14	0.000
14-62	0.121
62-103	0.514
103-146	0.531
146+	1.000

Example equivalency conversion calculation:
In year one, City or County "A" paves 10 miles of unpaved roads with ADT of 100.
10 * 0.514 = 5.14 miles of 150 ADT equivalent unpaved roads.

5. PAVED PUBLIC ROADWAY

A. Clean up of trackout, Erosion-Caused Deposition of Bulk Materials on paved public roadway: the owner and/or operator of the property from which the trackout or erosion-caused deposition came from shall upon discovery of mud/dirt that extends 50 feet or more from the nearest unpaved surface exit onto the paved public roadway shall:

i. Within 24 hours of discovery, remove the mud/dirt from paved public roadway with one of the following control measures. (If needed, restrict vehicles from traveling over said mud/dirt until such time as the material can be removed from the travel lanes of the paved public roadway)

a. Manually sweeping and picking up; or
b. Operating a rotary brush or broom accompanied or preceded by sufficient wetting to limit opacity to 20% or less; or
c. Operating a PM10 efficient street sweeper; or
d. Flushing with water, if curb and gutters are not present and where the use of water will not result as a source of trackout material or result in adverse impacts on storm water drainage systems or violate any National Pollutant Discharge Elimination System permit program.

ii. During removal of mud/dirt, do so in a manner that does not cause another source of fugitive dust.

iii. In the event unsafe travel conditions would result from restricting traffic pursuant to section A.i and removal of such material isn't possible within 72 hours due to a weekend or holiday condition, the provisions of section A.i can be extended upon notification to and approval by the Control Officer.

B. The owner and/or operator of any existing paved public roadways shall take the following actions prior to, during and after work on unpaved road shoulders:

i. Apply a dust suppressant(s) to the total surface area subject to the disturbance in sufficient quantity and frequency to maintain a stabilized surface.

ii. Prevent trackout by using one of the control measures listed in §4-1-030.5.A.i.

4-1-040. Recordkeeping

Any person subject to the requirements of this rule shall compile and retain records that provide evidence of control measure application (i.e. receipts and/or purchase records). Such person shall describe in the records, the type of treatment or control measure, extent of coverage, and date applied. Upon verbal or written request by the Control Officer, such person shall provide the records and supporting documentation as soon as possible but no later than 48 hours, excluding weekends. If the Control Officer is at the site where requested records are kept, such person shall provide the records without delay.

4-1-045. Reporting Requirements

Each city, county, or state agency with primary responsibility for any existing paved public roadway and unpaved roads shall take the following actions:

A. By January 30 of each year provide the district with a list of all unpaved roads under its jurisdiction, including data on length of, and ADT (if available) on, each unpaved road segment.

B. By January 30 of each year, submit to the district a list of unpaved roads which were paved during the previous year including the total number of unpaved roads miles, ADTs (if available) and their respective segments.

4-1-050. Records Retention

Copies of the records required by §4-1-040 (Recordkeeping) and §4-1-045 (reporting) of this rule shall be retained for at least two years.

4-1-060. Violations

Failure by any person to comply with the applicable requirements of this Article shall constitute a violation subject to penalty as provided in these rules and A.R.S. Title 49, Chapter 3, Article 3, A.R.S. 49-471 et. seq.

Violation Exemptions:

A. The opacity requirements of this rule shall not apply during:

i. Wind conditions that cause fugitive dust to exceed the opacity requirements if applicable control measures are implemented, applied and maintained, and all dust contributing disturbed surface area are stabilized.

ii. Emergency maintenance of flood control channels and water retention basins if at least 1 applicable control measure is applied, and maintained.

PINAL COUNTY AIR QUALITY CONTROL DISTRICT

NOTICE OF FINAL RULEMAKING

PURSUANT TO A.R.S. §49-471.01 *et seq.*

[M15-290]

1. Preamble

A. The Pinal County Air Quality Control District (PCAQCD), an operating division of Pinal County, proposed that the Board of Supervisors (BOS) adopt or amend certain rules under authority of A.R.S. §§49-479 and 49-480, which respectively authorize the board to adopt rules to control air pollution.

Due to ongoing monitoring violations of the PM_{10} (Particulate Matter 10 microns and smaller) National Ambient Air Quality Standard (NAAQS) in Pinal County (under both stagnation and high wind conditions), in 2012 the Environmental Protection Agency (EPA) designated a large portion of Pinal County as a moderate PM_{10} nonattainment area (West Pinal PM_{10} Nonattainment Area – defined in 40 CFR §81.303). Subsequently as a Clean Air Act (CAA) requirement for nonattainment areas, The Arizona Department of Environmental Quality (ADEQ) in coordination with Pinal County Air Quality Control District (PCAQCD) developed base year and attainment year PM_{10} emissions inventories (EI) for the nonattainment area. The top three emissions sources in the 2008 base year PM_{10} inventory for the West Pinal PM_{10} Nonattainment area are windblown dust (53%), unpaved roads (32%) and construction (9%).

The construction emissions are related to both activity and ground surface conditions (i.e. unstable ground surface conditions caused by construction activities impacted by windy conditions that results in PM_{10} emissions). The adopted construction fugitive dust rules in this rulemaking proposal are designed to provide standards (i.e. opacity,

8. TECHNICAL MATERIALS

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

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"SIP Submittal" Checklist Pursuant to 40 CFR Part 51, Appendix V
Re: Pinal County Rule Revisions of October 28, 2015

December 8, 2015

Note - The "Section" references in this document refer to the sections of the 3-ring binder submittal package as conveyed to the designee of the Governor of the State of Arizona, which package the District anticipates will be transferred to the EPA Administrator. This submittal reflects rule changes adopted by the Pinal County board of Supervisors on October 28, 2015.

2.1 Administrative Materials

a. Formal Letter
- See front section of SIP Binder, prior to Section 1

b. Evidence of Adoption
- Resolution No. 102815-AQ2 – See Section 7

c. Evidence of Authority
- Kevin Costello 11/24/15 letter Re: Authority to adopt Resolution No. 102815-AQ2 – See Section 2

d. Copy of the rule
1. See Section 7 which includes Resolution No. 102815-AQ2, adopting the changes embodied in the underlined/strike-through copy of the affected provisions of the Code.
2. Revisions affecting the SIP, or possibly affecting the SIP, are identified in §1-1-105.
3. See Section 3, which comprises a courtesy codification "clean copy" rules as amended, identified as "CODE OF REGULATION "CLEAN COPY" AS AMENDED OCTOBER 28, 2015"

Air Quality Control District
31 N. Pinal Street, Bldg F, P.O. Box 987 Florence, AZ 85132 **T** 520-866-6929 **F** 520-866-6967 www.pinalcountyaz.gov

- See Section 4, which comprises a courtesy codification "Strikeout copy" rules as amended, identified as "CODE OF REGULATION "STRIKEOUT COPY" AS AMENDED OCTOBER 28, 2015".

e. Evidence of conformity with procedure under state law, which notice and hearing requirements arise under A.R.S. §§49-112 and 49-479

- Copy of public notices
  1. See Section 5

- Certification that hearing was held
  1. Signed Resolution No. 102815-AQ2 confirming that the Pinal County Board of Supervisors held the public hearing and approved the resolution. – See Section 7
  2. Agenda and Minutes of the October 28, 2015 public hearing – See Section 7

f. Evidence of public notice in conformity with EPA procedures, which notice requirements arise under 40 CFR Subpart I

- See Section 5

g. Evidence of public hearing in conformity with EPA procedures, which hearing requirements arise under 40 CFR Subpart I

- See Section 7

h. Compilation of comments

- See Section 6

2.2 Technical Support

a. Identification of pollutants affected.

- The West Pinal PM_{10} Nonattainment area construction fugitive dust rules affect PM_{10}.

b. Identification of attainment/nonattainment area affected

- West Pinal PM_{10} Nonattainment Area.

c. Quantification of emission changes

- The "emission changes" from these SIP-affected provisions of this package equate to 3,022 tons per year emissions reduction for the attainment year (2018), table 6-6, 2015 West Pinal Moderate PM_{10} Nonattainment Area 2018 SIP, October 19, 2015 Proposed.

d. Demonstration of protection for

- NAAQS
  See 2015 West Pinal Moderate PM_{10} Nonattainment Area SIP

- PSD increments
  Not applicable

- RFP demonstrations
  Not applicable

- Visibility
  Not applicable

e. Modeling information

- Not applicable; no-redesignation is being sought

f. Showing the emission limitations are based on continuous emission reduction technology.

- Not Applicable

g. Evidence that plan limitations are enforceable as a practical matter

- Not Applicable

h. Compliance and enforcement strategies, including explanation of how compliance will be determined in practice.

- Kevin Costello 11/24/15 letter Re: Authority to adopt Resolution No. 102815-AQ2 – See Section 2

i. Special economic and technological justifications

- EPA has not defined any applicable requirements

Michael Sundblom
Air Quality Director

Greg Stanley
County Manager

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SIP ENFORCEABILITY CHECKLIST

Re: Pinal County Rule Revisions of October 28, 2015

December 8, 2015

Based on information and belief, the "SIP Enforceability Checklist" is not applicable with regard to the subject SIP submittal. This document is being presented simply to affirm that the lack of a substantive "Checklist" reflects design, rather than inadvertent omission of such a document.

The "SIP Enforceability Checklist" pertains to source-specific, or "prohibitory," rules.

Air Quality Control District
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9. DIGITAL COPY