Appendix 1

Responsiveness Summary to Comments Received on Public Review Draft 2005 Periodic Emissions Inventory for PM_{10} for the Maricopa County, Arizona, Nonattainment Area

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The purpose of this document is to present public comments and responses to comments received on the public review draft of the 2005 Periodic Emissions Inventory. The Maricopa County Air Quality Department (MCAQD) released the 2005 PM_{10} emissions inventory for public review and comment on January 23, 2007. The public review period ended on March 1, 2007. MCAQD and the Maricopa Association of Governments (MAG) have evaluated the comments received on the PM_{10} emissions inventory and prepared written responses to these comments. Table 1 contains a list of all individuals who submitted comments. Comments are taken verbatim from written comments received with a few minor exceptions (some ancillary tables and general introductory/closing statements not directly germane to the emission inventory calculations are not reproduced here). Comments about ambient air monitoring, control measures, dispersion modeling, zoning, source clustering, compliance, and complaint response are outside the scope of the emissions inventory report.

Table 1. Written Comments Received.

Comment Number	Commenter	Affiliation	Date Received
1	Charlie Carrier	n/a	Jan. 25, 2007
2	John Enkoji	n/a	Feb. 1, 2007
3	Oddvar Tveit	City of Tempe	Feb. 12, 2007
4 A–H	Stephen M. Brittle	Don't Waste Arizona, Inc.	Feb. 12, 2007
5 A–F	Tom Merrifield	n/a	Feb. 22, 2007
6 A–G	Shirley McDonald	Joint Environmental Task Force	Feb. 22, 2007
7	Shirley McDonald	Joint Environmental Task Force	Feb. 22, 2007
8 A–L	Amanda McGennis and Albert H. Acken, Lewis and Roca, LLP On behalf of Spencer Kamps	–Arizona Chapter of Associated General Contractors –Home Builders Association of Central Arizona	Feb. 22, 2007
9 A–L	Attachment to Comment #8 - Memorandum from Jim Wilson, et al., E.H. Pechan & Associations	–Arizona Chapter of Associated General Contractors –Home Builders Association of Central Arizona	Feb. 22, 2007
10	Larry Biland	U.S. Environmental Protection Agency	Feb. 22, 2007

Comment #1:

Living near the intersection of Lindsay and Riggs Roads, I have had plenty of opportunity to observe poor air quality. While there has been an abundance of new home building in this area the past 5 years, most of the builders have been pretty good in trying to comply with the "no dust" rules imposed by the county. The major problem that we have down here stems from 3 sources: 1. The existing farms that continue to pulverize the soil prior to planting cotton, etc. 2. The dairy farms where the powdered manure gets carried aloft with each passing breeze. 3. The Gila River reservation which plows and discs the soil for weed control, but is yet to plant anything to retain the soil. Since all three of these sources are "Grandfathered" in, they really have no incentive to lessen their dust-causing activities. Until the state or federal government gets serious about dust abatement it won't matter how much bluster is raised on this issue. Our legislature probably needs to give some sort of incentive such as a tax credit or something along

that line to bring the farmers on board. What we can do about the problems arising on the reservation is probably beyond our reach. I wish you good luck in your quest.

Response #1:
Dust compliance issues from agriculture, dairies, and tribal lands are outside the scope of the emissions inventory report. However, for your information within the Maricopa County PM_{10} nonattainment area, agriculture is required to implement best management practices to reduce PM_{10} emissions under Arizona Department of Environmental Quality's (ADEQ's) Agricultural PM_{10} General Permit (Arizona Administrative Code R18-2-611). Agricultural dust complaints can be filed on ADEQ's online complaint form at: http://www.azdeq.gov/function/ compliance/complaint.html or by calling (602) 771-2324.

Fugitive dust from dairies is regulated under Maricopa County Rule 310.01. The Maricopa County Air Quality Department's Dust Compliance Division investigates dust complaints concerning commercial livestock areas. Rule 310.01 imposes a 20% dust opacity limit and requires the prevention of excessive emissions of fugitive dust and implementation of one of the following control measures: dust suppressants (water or dust palliative), surface gravel, or shrubs and/or trees within 50 feet of animal pens. Dust complaints can be filed on line with Maricopa County Air Quality Department at: http://www.maricopa.gov/aq/contact_us/forms/dust_form.asp or by calling (602) 372-2703.

According to staff at the Gila River Indian Community's Department of Environmental Quality, the agricultural fields mentioned by the commenter have been out of production due to lack of water; however, these fields are expected to go back into production in early summer 2007, once water is received under a water rights settlement. Air quality concerns on the Gila River Indian Community can be referred to the Gila River Indian Community's Department of Environmental Quality by calling (520) 562-2234.

Comment #2:

One way to reduce emissions would be to ban drive up windows throughout Maricopa County. This would include fast food restaurants, banks, dry cleaners, pharmacies, etc. While convenient, they serve no essential or critical purpose and are only luxuries that should be banned in the interests of helping to clean our air. If the ban were universal and county wide, no specific business or establishment would suffer a disadvantage or gain an advantage. The numbers of cars that are idling at drive up windows on a daily basis in the county must number in the hundreds of thousands.

Response #2:
Development of potential control measures to reduce emissions is outside the scope of the emissions inventory. However, the Maricopa Association of Governments (MAG) is in the process of developing a preliminary draft comprehensive list of control measures to reduce PM_{10} for a new PM_{10} SIP. Your suggestion has been forwarded to MAG for consideration.

Comment #3:

The non-road mobile sources inventory for airport ground support equipment calculates emissions for 8 towered airports using the MAG Airport Emission Model that is limited to ground support equipment (Auxiliary Power Units). Below I have compared the numbers with calculations the URS Corporation did for the FAA for proposed projects at the PHX Sky Harbor International Airport in the 2006 EIS using a different model, FAA's Emission and Dispersion Modeling System. The numbers below are taken from table 3.5.9.1 in the FEIS that also include airport non-road on-site vehicle traffic. It appears that the draft 2005 inventory only accounts for Sky Harbor emissions, or is the use of different models/input the reason for this discrepancy in tpy inventories?

Inventory	Sources	PM_{10}	$PM_{2.5}$	NOx	SOx	NH3
PHX Final EIS (2001)	On-site Vehicles	7	5	233	n/a	n/a
	GSE	11	10	424	n/a	n/a
MAG 2005 Draft Emission Inventory	GSE	16.5	15.7	467.82	14.71	n/a

Response #3:
The MAG Airport Emissions Model was used to generate 2005 ground support equipment emissions for all the towered airports in Maricopa County. The airport emissions model was developed under Phase II of the MAG Aviation Air Quality Study, November 1996.

The table below lists the contribution from each of the towered airports in Maricopa County. It is clear from the table that Sky Harbor alone contributes more than 85% of the total emissions from GSE. MAG staff had not had an opportunity to review the methodology used by FAA in developing the FEIS for Sky Harbor. However, the differences between the Phoenix FEIS and the MAG 2005 GSE estimates are most likely explained by the used of different models and input assumptions.

Pollutant Contribution from GSEs at Towered Airports in Maricopa County

Airport	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Chandler	1%	1%	1%	0%	0%
Glendale	1%	0%	1%	0%	0%
Mesa Falcon	3%	1%	1%	0%	0%
Dear Valley	0%	0%	0%	0%	0%
Goodyear	4%	2%	2%	1%	1%
Sky Harbor	86%	89%	89%	92%	92%
Scottsdale	1%	1%	1%	1%	1%
Williams Gateway	3%	6%	5%	5%	5%

Comment #4 A & B:

> The draft emissions report draft (2005 Periodic Emissions Inventory for PM_{10} for the Maricopa County PM_{10} Nonattainment Area) is fatally flawed. For one thing, the emissions from sand and gravel operations and asphalt batch plants are exponentially under-stated.
>
> The MCAQD has systemically and programmatically failed to accurately account for the PM_{10} and $PM_{2.5}$ emissions from sand and gravel outfits operating in Maricopa County. Don't Waste Arizona, Inc. (DWAZ) has reviewed the annual emissions reports of several sand and gravel operations in Maricopa County, covering several years, and the reported PM emissions have no basis in reality. Some sand and gravel operations have reported no (zero) emissions of PM, year after year, while others have filed amounts that are vastly understated. This could indicate several things: 1) the agency itself has no quality control over the emissions reports being filed; and/or 2) there is someone at the agency who has deliberately allowed this to occur, i.e. corruption. In any event, the problem is systemic, and indicates that the entire county air program is fatally flawed.

Response #4 A & B:
All annual emission reports undergo a number of quality control checks; these are described in detail in Section 2.7 of the report. While the County does not currently regulate emissions of $PM_{2.5}$, EPA's Consolidated Emissions Reporting Rule (CERR) requires that $PM_{2.5}$ be estimated and reported in periodic emissions inventories. Thus $PM_{2.5}$ emissions are estimated based on calculated PM_{10} emission rates, using standard procedures outlined by EPA or other regulatory agencies (e.g., the California Air Resources Board).

Comment #4 C & D:

Further investigation into the agency's oversight of these sand and gravel outfits shows that their required dust control plans are frankly a joke. Several of these sand and gravel outfits claim that the enormous piles of dirt they create have a "natural moisture content" that prevents blowing dust. DWAZ has seen no evidence that MCAQD has ever tested the soil moisture content of any of these. Other ridiculous assertions include statements that driving trucks over miles of unpaved roads are controlled and produce little dust.

Some facilities state that their water trucks are responsible for keeping piles of dirt and dirt roads watered, yet when the agency actually showed up due to complaints, the inspector found that the water truck was not working.

Response #4 C & D:

The issue of enforcement in the sand and gravel industry is beyond the scope of the emissions report. The Department is currently in the process of conducting full inspections at all Maricopa County permitted sand and gravel facilities. All submitted dust control plans will be reviewed over the next several months for revision, where necessary, and approval.

Stockpiled materials will retain moisture from process controls with the surface subject to drying. Stabilization of the stockpile surface, in compliance with Maricopa County Rule 316, by crusting with water, application of dust suppressants, covers, or other methods are intended to control wind generated fugitive emissions. The soil moisture does not need to be tested unless there is a question of compliance with Rule 316 subsection 306.1 or 306.5.

Rule 316 is not a zero emissions regulation, however through the use of water, palliatives, or other dust suppressants unpaved roads fugitive dust generation and stabilization standards may be in compliance with the regulation. Comments made on an inspection report are intended to convey issues as observed at time of inspection. A non-operational water truck does not always indicate that a facility is in violation of a permit condition or rule standard. Violations are only issued based on inspector observations which unfortunately do not always occur contemporaneously with complainant observations.

Comment #4 E & F:

There is a faulty response to citizens' complaints, or not even a response. Citizens complain, then no one ever investigates or responds. In some cases, the inspector has called days or weeks after the complaint was filed, and if the inspector does not reach the complainant, there is no on-site investigation. When the head of the agency is notified that there has been no follow up to the complaint, nothing changes.

There are no night-time or weekend inspectors, and sand and gravel operations stop using spray bars and emit enormous amounts of dust without ever reporting these emissions on emissions reports. Even when these are reported to the director of the agency, no enforcement action or investigation ensues. (See a short video of what goes on at night at http://www.dontwastearizona.org/gravel.html) This URL was supplied to the agency director, and there was no action taken. The problem persists.

There is a lack of inspections while these sand and gravel outfits are actually operating. Time after time, the agency inspector shows up to conduct an annual inspection, and the facility is not in operation at that time, and the inspector does not return that year.

Response #4 E & F:

Response to citizen complaints and other enforcement issues are beyond the scope of the emissions report. Starting December 2006, inspection of the sand and gravel facilities became a shared responsibility between Dust Compliance and Stationary Source Compliance. This effectively increased the number of responding inspectors by 30. The Department is committed to responding to all complaints within 24 hours and is working on plans to institute a second and weekend shift pending

approval of staffing. By Department policy all fugitive dust complaints result in an inspection and contact with the complainant where possible.

Comment #4G:

> There are portable facilities operating in Maricopa County using ADEQ-issued permits. There are no records of their emissions or of any inspections of these outfits while they are operating by ADEQ. None of these emissions are accounted for in the draft report.

Response #4G:

On the contrary, portable sources with permits issued by ADEQ are addressed in section 3.3.11 of the report, "State-permitted portable sources". Emissions attributable to activity within Maricopa County were estimated based on information provided by the Arizona Dept. of Environmental Quality.

Comment #4H:

> The worst air quality is in the areas where sand and gravel outfits are operating, along the Salt River Bed and along the Agua Fria riverbed. There are several of these sand and gravel outfits along the Salt River Bed, which has the highest PM levels, and where the exceedances of the federal standard have occurred. Rusty Bowers, while a state senator, demanded that the MCAQD's air monitors at the 22nd Avenue and Lower Buckeye Road location be moved. He is now officially the lobbyist for the sand and gravel outfits. The City of Phoenix was complicit in the moving of the 22nd Avenue and Lower Buckeye Road monitor to 43rd Avenue and Broadway because of its vast earthmoving project, the Rio Salado Project, and the certainty that this would trigger even more exceedances at that monitor.
>
> The second worst place for PM concentrations in the ambient air in Maricopa County is in the Sun City area, where there are 26 sand and gravel outfits and asphalt plants in a five-mile radius operating along the Agua Fria riverbed. The MCAQD's own money was spent to conduct this monitoring. There is no industry in Sun City other than the 26 sand and gravel outfits and asphalt plants. Folks there don't commute to work. Clearly, the 26 sand and gravel outfits and asphalt plants are the source of the particulate matter.

Response #4H:

Annual emissions from mining and quarrying sand and gravel operations are included in the 2005 PM_{10} emissions inventory in Chapter 2 (Point Sources) and Chapter 3 (Area Sources). Ambient monitor siting and ambient concentrations are outside the scope of this report; however, MCAQD would like to clarify the facts pertaining to comments made regarding relocation of the Salt River monitor and PM_{10} concentrations in Sun City.

The Salt River monitor was established at a City of Phoenix vehicle maintenance yard (near 19th Avenue and Lower Buckeye Road) in 1994. In January 2002, the monitor site was relocated from its original location in the southeast corner of the property to the roof of the City office building on the property. Removal of the monitor site was requested by the City of Phoenix because of scheduled construction on and near the vehicle maintenance yard property (unrelated to the Rio Salado project construction which actually began in 2000).

Efforts to find a suitable replacement site with comparable PM_{10} concentrations and industrial emissions were conducted by Maricopa County and Arizona Department of Environmental Quality in 2002. The West 43rd Avenue site was determined to be a suitable replacement site. This site is located at a Maricopa County Department of Transportation storage lot and is surrounded by a combination of heavy industry and residential homes. The main purpose of the monitor is to measure maximum concentration PM_{10} and to determine the impact on ambient pollution levels of significant sources or source categories. The sources around the site include sand and gravel operations, auto and metal recycling, landfills, paved and unpaved haul roads, and cement casting.

In 2002, ADEQ analyzed the PM_{10} concentrations and source attributions for the West 43rd Avenue site and the Salt River site. The results of ADEQ's analysis are documented in the Salt River PM_{10} State Implementation Plan Revision.[1] ADEQ concluded that despite the contrast between the two sites in their nearby emission sources, the PM_{10} concentrations were nearly equivalent. Their analysis showed that diurnal patterns are similar and late evening and early morning concentrations were nearly identical. ADEQ concluded that since PM_{10} concentrations at the West 43rd Avenue site are higher than the Salt River site, the former is an adequate replacement for the latter. This equivalence was also born out by a cursory look at the regulatory important extreme values. In 2002, the Salt River PM_{10} maximum concentrations were 249, 184, and 174 $\mu g/m^3$, with the first two under high wind conditions. At West 43rd Avenue, the highest PM_{10} concentrations were about the same: 243, 174, and 181 $\mu g/m^3$, with the first two under high wind conditions. Under low-wind and high-wind conditions, the two sites recorded equivalent maximum 24-hour average PM_{10} concentrations.

In response to concerns from Sun City residents in the vicinity of several sand and gravel operations, in 2004 MCAQD contracted with Weston Solutions, Inc. to conduct a 4-month ambient air quality study along the Agua Fria River basin in the Sun City area. The study focused on particulate matter and polynuclear aromatic hydrocarbons (PAHs). Only a single day at one monitoring location had a 24-hour PM_{10} concentration above NAAQS of 150 $\mu g/m^3$. This concentration was caused by a natural occurrence which was recorded on a county-wide basis and was not the result of a particular source or industry. The event resulted in elevated PM_{10} concentrations at all the study monitors. Furthermore, since this was a single occurrence in a short-term monitoring program (less than 1 year), this elevated concentration does not constitute a violation of the NAAQS.

Lastly, in response to Sun City residents concerns, in spring 2007, MCAQD installed a special purpose PM_{10} monitor in the Coyote Lakes subdivision of Sun City near 111th Avenue and Beardsley on April 1, 2007. The real-time data is available on the county website at http://www.maricopa.gov/aq/divisions/monitoring/Default.aspx.

Comment #5A:

> The fundamental question I have when reviewing this document is "where the beef;" by that I mean "where is the data." Because the "data" for this study is primarily a calculation for each facility or activity, I feel that appendices should be available to review that shows calculations for each permitted facility mentioned or activity. I think there is too much latitude for error and misrepresentation of the calculations. Furthermore, for each permitted facility or activity, there needs to be more detail on any adjustments made, for instance, how were contributions made when NOVs were issued, when operating in a manner inconsistent with the permit. In the report oral conversations with a facility were noted as part of the data base; notes from those conversations should be included in the appendix.

Response #5A:

The emissions inventory report follows EPA guidelines for required documentation. Individual facility reports are available at the Department offices and are available for inspection and review upon request; reproducing this level of detail in the inventory report itself would be inefficient (and cost-prohibitive). In developing emission inventories for SIP planning purposes, the US EPA requires the application of rule effectiveness which is designed to reflect the fact that regulatory programs typically achieve less than full compliance. Section 2.3.2 of the report describes the application of rule

[1] Final Salt River PM_{10} State Implementation Plan Revision, Technical Support Document Chapter 3, Arizona Dept. of Environmental Quality, Air Quality Division, January 2004.

effectiveness, and all facilities that that have had rule effectiveness applied to their emission calculations according to current EPA guidance, are clearly indicated in the report.

Comment #5B:

> I feel that any monitoring data gathered needs to be included. This data needs to be utilized to calibrate and adjust the calculations. Perhaps this was done in this report; if so, this needs to be made very clear, perhaps in a separate chapter.

Response #5B:

MCAQD assumes that the commenter is referring to monitoring data from stationary source continuous emissions monitors (CEMs) rather than ambient air monitoring data. Data from CEMs are preferred for estimating a source's emissions; however, CEMs data from individual sources are not always available. The EPA only requires certain large stationary source categories to install and operate CEMs. Electric utilities are the only source category operating within Maricopa County, required to operate CEMs. Thus, source performance tests and emission factors are frequently the best or only method available for estimating emissions.

Maricopa County has an established annual reporting program for sources with air quality permits. Businesses submitting annual emission reports must use the most accurate method for calculating actual emissions. Whenever available, emissions are calculated based on CEMs data. When CEMs data are not available, emissions are calculated based on source performance tests, material balance, emissions factors from EPA's AP-42, or by equivalent methods supported by back-up documentation that will substantiate the chosen method.

Comment #5C:

> I feel there needs to be a chapter entitled "Analysis or Interpretation" of the data and a chapter entitled "Summary or Conclusion/Recommendations." I understand this is an inventory, but the EPA is asking this inventory to be done for a reason. It is unclear to me what this inventory is going to do for the public in order to address the overall problem of non-attainment of PM_{10}.

Response #5C:

The Clean Air Act requires states with areas failing to meet National Ambient Air Quality Standards (NAAQS) to produce a state implementation plan (SIP). A SIP is an enforceable plan developed at the state and local level that explains how the area will comply with air quality standards according to the Federal Clean Air Act and its amendments.

The PM_{10} emissions inventory is one component of the SIP currently being developed to address the PM_{10} problem in Maricopa County (referred to as the "Five Percent Plan"). The Five Percent Plan will include historical background information, a description of the nonattainment area, an assessment of air quality conditions and ambient air quality data for the area, an emissions inventory of sources of pollutants, control strategies, an attainment demonstration, and contingency provisions. Before the Five Percent Plan is submitted to EPA in December 2007, it will be available for public review. The public review phase is slated for fall 2007.

Comment #5D:

> In order to address the EPA compliance issue of non-attainment for Maricopa County, this inventory of data needs to be mapped and an analysis of the density of tonnage of pollutants can be better estimated. This really needs to be completed in order to address Item #2 above *(see comment #5B in this document)*. The results of this density analysis should be used to address where more monitoring stations need to be set up to calibrate the inventory data throughout Maricopa County.

Response #5D:
Ambient air monitoring stations are set up to measure ambient air not to calibrate the emissions inventories. MCAQD's Air Monitoring Division maintains ambient air monitoring networks within the borders of Maricopa County. The purpose of the ambient air monitoring network is to sample air pollution in a variety of settings, assess the health and welfare effects, and assist in determining sources of air pollution.

Conversely, emissions inventories are developed to meet Federal Clean Air Act requirements and they provide a baseline understanding of local and regional sources of emissions. The Maricopa Association of Governments is developing a PM_{10} state implementation plan (referred to as the Five Percent Plan). The Five Percent Plan must show reductions in PM_{10} emissions of five percent per year until attainment is achieved at all monitors. The 2005 PM_{10} emissions inventory will be the starting point for the five percent per year reductions.

The Five Percent Plan will also include an assessment of air quality conditions and ambient air quality data for the area and must demonstrate through modeling that the PM_{10} standard will be met at all monitors. Before the Five Percent Plan is submitted to EPA in December 2007, it will be available for public review. The public review phase is slated for fall 2007.

Comment #5E:

> Where the density of pollutant emissions are high, care needs to be taken to ensure that ARS 49-401-B is not violated. This statute states that a new facility shall not begin operation if existing air quality is already degraded beyond the EPA standards.
>
> In my mind the EPA standards are what protect my health and my property through the vehicle of ARS 49-401A, and as a person living 180 feet down gradient from a future emitting facility, I question the applicability of the calculations presented herein in order to ensure compliance with the statute. The calculations in this report tell me nothing about how this inventory affects me personally. In my mind this report so far has been a waste of my tax dollars.

Response #5E:
The comment is outside the scope of this emissions inventory report. An emissions inventory is not meant to provide a measurement of impacts on a particular individual. An emissions inventory is a comprehensive listing by source category of air pollutant emissions. Emissions inventories are developed to meet Federal Clean Air Act mandates and to identify sources and general emission levels, patterns, and trends to develop control strategies and new regulations.

Conversely, ARS 49-401-B requires industries to operate within the emission standards set by the director of the Arizona Department of Environmental Quality. The Maricopa County Air Quality Department has the legal authority to enforce all Air Quality Rules and Ordinances within County borders. The rules are adopted under the authority granted by Arizona Revised Statures §49-479 to fulfill the State's responsibilities under the Federal Clean Air Act and its amendments to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards.

The Maricopa County Air Pollution Control Regulations were put in place with the goal of assisting Maricopa County in complying with the Federal health-based National Ambient Air Quality Standards. Air permit conditions are based on an engineering review, which included the calculation of potential emissions, and an analysis of applicable County, State, and Federal regulations. Each facility is required to comply with all applicable Maricopa County Air Quality Department regulations and

standards related to their operations. Failure to meet the requirements of all applicable rules can result in an enforcement action to be brought against the facility.

Comment #5F:

> Personally I am involved in negotiating with a future emitting facility 180 feet from my house because in my opinion the Maricopa County zoning laws for county islands are so relaxed and do not support ARS 49-401-A. I feel the negotiations with the future emitting facility next to my house are going very well, but I still question the legality of the county zoning laws given the statements made in ARS 49-401-A, which should apply to the entire state. I am not a lawyer, but in my opinion the County is using an archaic federal mining law to be used as a basis for granting an exemption to normal zoning regulations that would protect me, my family and my property under ARS 49-401-A. It appears to me to be a local vs. federal rights legal issue. The irony is that the local government is using federal law to govern locally, which to me is absurd, and I question its legality, especially in view of the state statute.

Response #5F:

Zoning issues are outside the scope of this emissions inventory report.

Comment #6A:

> The para. 2.3.4 example calculation on page 20 uses a rule effectiveness factor of 93.88% for a "point source" process. Since this plant (River Ranch Plant #40) was listed in Table 2.4-1 as a "point source", it appears that this would be the correct RE factor. However, when applying the "non-point" source RE factor (54.36%) from paragraph 2.3.4, to the annual emission report PM_{10} annual totals for each of four Rinker plants, it appears that the numbers in Table 2.4-1 were derived using this factor rather that the point source factor. Why?

Response #6A:

In the example equation on page 20, of section 2.3.4, which describes how annual emissions are calculated to incorporate rule effectiveness, MCAQD incorrectly applied the point source RE percentage (93.88%) to a process that should have used the Rule 316 effectiveness study percentage (54.36%). As stated in Appendix 2.2, all processes that are subject to Rule 316 and use a manual control such as watering are subject to the Rule 316 effectiveness percentage (54.36%), regardless if the process is categorized as a point or non-point process. Table 2.4-1 correctly summarizes the emissions from each facility and includes processes that are subject to the Rule 316 effectiveness percentage (54.36%). MCAQD will correct the example equation in section 2.3.4.

Comment #6B:

> Are all of the sand and gravel mining plant data derived from the nonpoint source factor? Are you going to collect fees for the extra emissions?

Response #6B:

Data used to calculate emissions from sand and gravel facilities are based on annual surveys completed by individual sand and gravel facilities from within Maricopa County. MCAQD reviews the annual surveys for completeness and accuracy of data submitted. For this report, MCAQD also applies rule effectiveness percentages to each reported process where appropriate. For sand and gravel facilities, all processes that are manually controlled by water and are subject to Rule 316, a rule effectiveness percentage of 54.36% is applied to those processes (see Appendix 2.2). Processes that are not controlled manually with water (such as a baghouse) apply the point source rule effectiveness percentage of 93.88% (see Appendix 2.3). For processes where no controls are used, neither the point source nor the Rule 316 rule effectiveness percentages apply.

Emission fees are outside the scope of the emissions inventory report. See Response #6C for an explanation of increased individual facility emissions due to the application of rule effectiveness percentages.

Comment #6C:

> When the PM_{10} permit limits for seven plants are compared with the annual emissions shown in Table 2.4-1, six of the seven are out of limits. Are you going to compare all of the plant permit limits with the annual emissions shown in Table 2.4-1? Are you going to issue violations? Why not?

Response #6C:

The application of rule effectiveness percentage can substantially increase an individual facility's base reported emissions. Rule effectiveness percentages are a useful tool in the development of regional inventory to help predict the effects of assumed operator error and faulty control equipment. It is possible that the process of applying rule effectiveness to individual facilities will increase their annual emissions beyond their permit limits. However, annual emission estimates that include adjustments for rule effectiveness cannot be used for compliance purposes, as compliance with permit limits is based on actual reported emissions.

Comment #6D & E:

> Of the 30 permits that we have, 23 would be considered point sources according to the 5 tpy criterion. Six of these are 2006 permits. In the July 7, 2005 response to comments for the 3/15/05 Vulcan permit #970105 Hearing, it is stated that there are 87 sand and gravel operations in the valley. Add the six 2006 permits, and it becomes 93 plants. If 23/30 permits are point sources, then the number of point sources listed in Table 2.4-1 should be about 70 rather than the 20+ shown there. The criterion is the 5tpy not whether a plant is portable or not.
>
> With numbers like these that are questionable, how are you going to convince the public and the EPA that you have caused a 5% reduction this year and for the next 3 years?

Response #6D & E:

MCAQD determined which facilities are categorized as point sources through a review of all 2005 annual emissions reports that were submitted to MCAQD. In order to be categorized as a point source, a facility needed to have actual reported emissions that meet or exceed 25 tons of carbon monoxide (CO); or 10 tons of either volatile organic compounds (VOC), oxides of nitrogen (NO_x), or sulfur oxides (SO_x); or 5 tons of either particulate matter less than 10 microns (PM_{10}) or ammonia compounds (NH_x). In addition to meeting or exceeding one of the pollutant thresholds noted above, MCAQD chose to list only the permanent stationary sources (non-portable) as part of Chapter 2 (Point

Sources). MCAQD-permitted portable concrete batch and sand and gravel facility emissions are included in Chapter 3 (Area Sources) Sections 3.3.4 and 3.3.5, respectively. All MCAQD-permitted portable were assumed to operate in the nonattainment area in order to conservatively estimate emissions. ADEQ-permitted portable facility emissions are included in Section 3.3.11. MCAQD listed 36 MCAQD-permitted facilities in the point source chapter that engage in sand and gravel activity. 71 MCAQD-permitted facilities comprise the area source section for sand and gravel activities (mining and quarrying, 3.3.5); and of those 71, 23 are listed as portable sand and gravel permits. ADEQ reported 69 ADEQ-permitted portable sources that comprise the emissions in Section 3.3.11.

Comment #6F:

> The nonroad internal combustion engines that are exempt still contribute to the nonattainment here. Add their pollution to the totals. Some are 1000hp.

Response #6F:

All emissions from nonroad engines are included in Chapter 4. Nonroad engines associated with sand and gravel or concrete batch facilities are included in Section 4.5 (Construction and mining equipment) and 4.6 (Industrial equipment).

Comment #6G:

> There are plenty of witnesses in the Northwest Valley who see dust at night from mining operations because water sprays are not used. When water is not used, pollution is not 30%, its 100%!

Response #6G:

Part of the Rule 316 rule effectiveness study takes into account the compliance rate of facilities that are controlling process emissions through the use of water. Failure to use water to control emissions is included in the quantification of the effectiveness percentage of the Rule 316 study (contained in Appendix 2.2 of this report). Using this rule effectiveness percentage, MCAQD has on average increased emissions from these types of processes to account for possible non-compliance with dust control or watering requirements.

Comment #6H:

> The out of compliance condition here is evidence that guessing what the total pollution is … is not working. You need more monitors. You also need to take into account what the excess pollution is doing to the public health, even your own families. It is especially hazardous to those who live near clusters of plants.

Response #6H:

Ambient air monitoring is outside the scope of the emissions inventory report. MCAQD develops an annual network review which is posted on MCAQD's website at: http://www.maricopa.gov/aq/divisions/monitoring/network.aspx. A fundamental purpose of this review is to provide the citizens of Maricopa County with relevant information, so that they may make better decisions about their lives. This information is used in a variety of ways. Most importantly it is used to determine the attainment status for parts of Maricopa County. Mathematical models are using the data to determine the effectiveness of control programs on pollution levels.

It is physically and fiscally impossible to monitor air quality in every location, representative samples must be obtained. The optimal locations for obtaining these samples are determined by using the monitoring objectives and the spatial measurement scales established by EPA. For example, there might be numerous locations where the highest concentration of particulate matter may occur. Using

EPA monitoring objectives and spatial measurement scales, only one or two sites will be established to represent all of the high-concentration areas.

Comment #7:

> The Joint Environmental Task Force also supports the comments from Tom Merrifield. The idea of a three dimensional plot of the data would be very enlightening. Looking at averages for the valley as a whole versus finding out where the "clustered" pollution is occurring and causing the noncompliance is a reasonable as well as a scientific approach.

Response #7:

Ambient air monitoring stations are set up to measure ambient air not to calibrate the emissions inventories. MCAQD's Air Monitoring Division maintains ambient air monitoring networks within the borders of Maricopa County. The purpose of the ambient air monitoring network is to sample air pollution in a variety of settings, assess the health and welfare effects, and assist in determining sources of air pollution.

Conversely, emissions inventories are developed to meet Federal Clean Air Act requirements and they provide a baseline understanding of local and regional sources of emissions. The Maricopa Association of Governments is developing a PM_{10} state implementation plan (referred to as the Five Percent Plan). The Five Percent Plan must show reductions in PM_{10} emissions of five percent per year until attainment is achieved at all monitors. The 2005 PM_{10} emissions inventory will be the starting point for the five percent per year reductions.

The Five Percent Plan will also include an assessment of air quality conditions and ambient air quality data for the area and must demonstrate through modeling that the PM_{10} standard will be met at all monitors. Before the Five Percent Plan is submitted to EPA in December 2007, it will be available for public review. The public review phase is slated for fall 2007.

Comment #8A:

> Home Builders and AGC were extremely disappointed that the Draft Emissions Inventory and supporting studies were developed without stakeholder input and involvement. Home Builders and AGC have a great deal of technical expertise and unique understandings about their industries. This knowledge is an invaluable resource that MCAQD should use when developing the best emissions inventory possible.
>
> For example, Home Builders and AGC expressed a willingness and desire to work with MCAQD to develop a technically sound and rigorous Rule Effectiveness Study methodology in the summer of 2006. Unfortunately, MCAQD developed its initial study behind closed doors. Additionally, MCAQD did not provide an opportunity to review the Draft Emissions Inventory when it was first developed.
>
> Notwithstanding these earlier disappointments, Home Builders and AGC welcome the opportunities provided by MCAQD to provide input to the Draft Emissions Inventory during the public comment period and appreciate MCAQD's willingness to consider additional information provided.
>
> We recognize that some of the comments and ideas suggested by Home Builders and AGC will require some effort to address. We hope that MCAQD does not simply take the position that there is now too little time left to resolve outstanding issues and incorporate Home Builders' and AGC's suggestions. To ensure that timing and resource issues are not a concern when developing the final emissions inventory, Home Builders and AGC hereby volunteer their expertise and assistance and stand willing to assist MCAQD in its efforts.

Response #8A:

MCAQD concurs that an open process is important to developing an emission inventory that will become part of a state implementation plan such as the Five Percent Plan. This is the reason MCAQD

released on January 23, 2007, a draft of the PM_{10} emissions inventory with supporting documentation via the department's website. MCAQD made the document available to the public for a 30-day review and comment period. In addition, MCAQD held a public workshop on January 30, 2007, to provide an overview of the emissions inventory and to answer questions. MCAQD is evaluating and responding to all comments received during the public review period.

EPA emissions inventory guidance requires EPA approval and thus a public review process for emission inventories that are deemed to be of "regulatory significance". In general, this means that the approval process for an emissions inventory of "regulatory significance" will be as a component of a SIP submittal. Clearly, the draft 2005 PM_{10} emissions inventory is of "regulatory significance" and thus requires public review and EPA approval as a component of the Five Percent Plan submittal. Because the public review process for the Five Percent Plan is not scheduled until September 2007, after all the technical work and attainment demonstrations are completed, MCAQD made the draft PM_{10} emissions inventory available for public review well in advance of when the document was technically required to be made available. Further, MCAQD provided the public an opportunity to review the document less than one week after it went through internal peer review at Maricopa Association of Governments and Arizona Department of Environmental Quality.

Comment #8B:

> It is critical that all PM_{10} sources be identified and explained. This includes secondary and condensable particulate formation.
>
> For all emission sources, please also identify, and explain the reasons for using, the data sources, assumptions, emission factors, methodologies and categories used to develop emission estimates. For example, we recommend that summary tables 1.6-10, 1.6-1 1, 3.1-1, 3.6-1, and 3.6-2 be revised to identify construction sources by subcategories, as has been done for other sources such as agriculture, which is subdivided into various agricultural activities.
>
> Additionally, with respect to construction emission estimates, it would be helpful to have definitions of the various subcategories of construction sources that are identified in tables 3.3-17 through 3.3-21. We are concerned that MCAQD's methodology for identifying construction subcategories, which was based on dust control permit forms, does not necessarily correlate to emission factors developed by WRAP, EPA, and others. Roughly two-thirds of the road construction projects in Maricopa County over the past two years involved reconstruction above sub-grade and sub-base or milling and overlaying. These activities generate relatively few emissions.

Response #8B:

MCAQD is willing to address specific instances where data sources, emission factors, and methodology may be unclear; however, it is difficult to respond to sweeping generalizations. MCAQD has used the most current published emission factors and data available and thoroughly documented all data sources, assumptions, and emission factors. The 2005 PM_{10} emissions inventory report, including appendices, encompasses more than 200 pages of documentation.

Summary tables 1.6-10, 1.6-11, 3.1-1, 3.6-1, and 3.6-2 have been revised to identify separately the following construction subcategories: residential, commercial, road, and "other" construction activities ("other" includes trenching, demolition, weed control, site prep/land development, and temporary storage yard projects).

MCAQD categorizes the project type from information provided by the permit applicant on the Application for Dust Control Permit. Prior to July 2005, the applicant indicated the project type by selecting "Type of Project" from a discrete series of check boxes. The dust control permit application

form was revised effective July 2005 in response to EPA concerns requiring more documentation regarding the control measure to be used at each project. Since that time, information on the project has been provided by the applicant in a number of ways: data provided on the application forms include "Name of Project" (Item 7), "Description of Project" (Item No. 8), and "Project Site Drawing" (Item 12). From this information, MCAQD permit intake staff assign a "project type" code (consulting with the permit applicant in-person or by phone if additional details are needed).

While a single permit may encompass more than one project category (e.g., a dust control permit for a new "residential" development often entails substantial road construction activity), the assignment of a category for emission calculation purposes is directed at the **primary** activity at the site. MCAQD acknowledges that the emission factor used for all "road construction" projects in its January 2007 emissions inventory report reflects "worst-case" conditions[2], and thus has adjusted its assumptions (described in detail in Response 9B, below) for the May 2007 report.

Lastly, a dust control permit is only required for reconstruction above sub-grade and sub-base or milling and overlaying should the contractor remove sufficient surface road layers to reach the dirt or rock surfaces. However sources that do not reach the dirt or rock surface, may still require a dust control permit for a storage yard. For example, one company that does repaving that does not involve sub-grade and sub-base does not obtain their dust control permit for the repaving work, they obtain the permit for the other disturbed areas, such as storage piles. Should this type of reconstruction activity be included in the "road construction" projects it will be relatively small acreage in comparison to the total "road construction" acreage.

Comment #8C:

> Home Builders and AGC believe that the best way to ensure the emissions inventory represents actual conditions is to use the best information available. We believe local, current, and measured observations are superior to emission factors extrapolated from national or regional sources. For example, we understand that unpaved road emissions are based on data from the 1990s. See page 108, estimates for miles of improved roads and traffic levels. This information is simply too stale to be used for this important project, which must be comprehensive, accurate, and current.

Response #8C:

MAG used the best available data on unpaved roads to prepare the PM_{10} emissions estimates in the Draft 2005 Periodic Emissions Inventory for PM_{10}. The unpaved road mileage by traffic volume category (i.e., low – average of 4 average daily trips (ADT) and high – average of 120 ADT) was derived from a database developed for the MAG Serious Area PM_{10} Plan. The Serious Area PM_{10} Plan, that was approved by EPA on July 25, 2002, reduced the miles of unpaved roads to reflect legally-binding commitments made by local jurisdictions to pave and stabilize unpaved roads by 2006. To ensure that these unpaved road assumptions continue to be representative of the PM_{10} nonattainment area, MAG will work diligently to update the traffic counts on a sample of unpaved roads. MAG will also apply geographic information systems (GIS) and recent aerial photography to estimate the current unpaved road mileage. Since it will take several months to collect this data, it will not be available to recalculate unpaved road emissions for the final 2005 periodic emissions inventory; however, it will be available for use in estimating the 2007 unpaved road emissions for the Five Percent Plan for PM_{10}.

Comment #8D:

[2] MRI, 1996. Improvement of Specific Emission Factors (BACM Report No. 1), Final Report, March 29, 1996, Table 7.

E.H. Pechan & Associates, Inc. (Pechan) has reviewed the assumptions, emission factors, methodologies, and calculations for some of the major source categories identified in the Draft Emissions Inventory. Pechan's analysis is attached and incorporated by reference. As detailed in the attached analysis, Pechan discovered specific concerns with the following categories: (1) construction; (2) windblown dust; (3) paved roads; and (4) unpaved roads.

Pechan's technical concerns include, but are not limited to, the following: (1) computational errors; (2) the use of different assumptions, emission factors, and data in the Draft Emissions Inventory when compared to other inventories; (3) the lack of supporting documentation for some assumptions; and (4) the use of a rule effectiveness methodology that does not adequately represent actual conditions at complex sources such as construction sites.

The following table, solely based on Pechan's analysis of construction emissions, shows the relative contributions of major sources and total emissions in the PM10 nonattainment area:

Source Category	Total PM_{10} Emissions	% of Total Emissions
Residential: Single-Family	895	1.46%
Residential: Multi-Unit	2051	3.33%
Commercial	2908	4.73%
Road Construction	1754	2.85%
Site Prep/Land Development	216	0.35%
Other Construction	58	0.09%
Total Agriculture	2719	4.42%
Offroad Rec. Vehicles	2159	3.51%
Unpaved Parking Lots	3009	4.89%
Windblown dust	1087	1.77%
Wildfires	4860	7.90%
Aircraft	6364	10.35%
Paved road Fugitive Dust	13783	22.41%
Unpaved Roads	8490	13.80%
Other Emission Sources	11154	18.13%
Total Emissions	61507	100.00%

Pechan has proposed alternative rule compliance methodologies that they believe are appropriately rigorous and detailed for the important purpose of estimating Rule 310 compliance. We requested that MCAQD revise the Draft Emissions Inventory to be consistent with Pechan's suggestions.

Response #8D:

MCAQD and MAG responded to each of Pechan's comments separately in responses 9A–9L.

Comment #8E:

It is a common practice in the construction industry for one entity to obtain a permit for a large site, and then shortly thereafter subdivide the site to builders, who then obtain another permit for a position of the same site originally covered under the first permit. Accordingly, using the permit database to determine the amount of acreage actually under construction can be only a starting point for any assessment of acreage under construction.

We are glad to learn that MCAQD recognizes this, and has attempted some creative solutions to address this problem in past. We appreciate MCAQD's expressed interest in obtaining additional information that will further help it identify instances of double counting.

A good first place to look is at all permits where the site activity listed is site preparation/land development. The entities that obtain these permits are typically large developers who then pass along portions of the large site to individual builders. In fact, MCAQD should review all permits obtained by these entities as well as the permits pulled by others in the same area to identify instances of double-counting.

Additionally, this is a common practice in growing areas near the boundaries of the metropolitan area. We recommend reviewing permits in those areas to determine whether double-counting has occurred. We offer our assistance in that effort. Implementing the recommendations will allow MCAQD to revise table 3.3-17 to best reflect actual conditions.

Response #8E:

MCAQD looked at a sample of the largest acreage permits where the project type was identified as site preparation/land development and saw no indication that the initial site preparation/land development company ownership had been transferred to another entity. MCAQD believes if this does occur it is relatively small in comparison to the overall acreage being disturbed.

Comment #8F:

In addition to the limitations of the County's methodology highlighted in Pechan's comments, there are a number of other problems with the Rule Effectiveness Study.

We are greatly concerned that MCAQD's proposal is overly simplistic and insufficiently rigorous for its purpose.

Dust control operations are complex, with several activities ongoing at any one time. Rule 310 is also extremely complex, with dozens of subsections and requirements. However, under the County's approach, limited noncompliance with one requirement, or limited noncompliance at one small area of a dust generating operation, deems the entire site uncontrolled. For example, under MCAQD's methodology, a 1000 acre site with 10 exits that has 51 feet of trackout from those ten exits, is assumed to be completely uncontrolled.

The County's methodology is obviously flawed. As the illustration above suggests, it does not reasonably represent actual conditions. It also conflicts with EPA guidance. In addition, even the underlying inspection data does not support MCAQD's approach. For example, for one site deemed to be noncompliant, the inspector acknowledges that trackout is less than 50 feet, and that the site has “overall good stabilization.” See inspection # 609003.

MCAQD has attempted to justify its approach by expressing the concern that even limited noncompliance at a construction site can have an impact on monitored readings of particulate matter. This anecdotal belief, however, in no way justifies creating an emissions inventory that does not represent actual conditions. After all, an inventory that represents actual conditions is what the Clean Air Act requires. The only way to develop a plan that will achieve attainment is to start with an emissions inventory that represents real world conditions. MCAQD's Rule Effectiveness Study does not do that.

MCAQD has also attempted to justify this approach by stating that EPA has remarked in the past that rule compliance was relatively low. We are unaware of any EPA study conducted of' Rule 310 compliance. If one has been conducted, it should be made available for public review. To the extent that EPA's belief was based on anecdotal observations made while driving around the Phoenix metropolitan area several years ago, we submit that these observations are stale and pale in comparison to the scientifically rigorous methodology proposed by Pechan. Accordingly, these anecdotes do not justify an abnormally low compliance rate that does not represent actual conditions.

Response #8F:

Rule effectiveness is a term that describes a method to account for the reality that not all facilities covered by a rule are in compliance with the rule 100% of the time. A rule effectiveness study is an examination of a rule and its implementation. Rule effectiveness studies are field evaluation studies designed to determine the percentage of non-compliance among sources for the selected rule. A representative number of sources within the study group are chosen at random and inspected. The effectiveness of a rule is reflected in the non-compliance rates determined by dividing the number of non-complying facilities by the number inspected.

An inspection is a snapshot in time and reflects conditions which may be present most of the time. In the rule effectiveness study, a site with an observed violation during the inspection was deemed noncompliant (not completely uncontrolled). Similarly, other sites in the rule effectiveness study with no observed violations were deemed to be 100% compliant, although violations may have occurred before or after the inspection.

The rule effectiveness study was conducted in accordance with EPA rule effectiveness guidance. Inspection report # 609003 noted an observed violation for a trackout control device that was not suitable. This is a violation of Rule 310. This inspection report supports MCAQD's approach; the site had an observed violation and was deemed to be noncompliant.

MCAQD made no mention in the rule effectiveness study that "limited noncompliance at a construction site can have an impact on monitored readings" nor were past EPA remarks regarding low rule compliance mentioned in the study. Neither of these issues was factored into the study results. The study results were based on compliance status established during inspections and determined by dividing the number of noncomplying facilities by the number inspected.

Comment #8G:

> MCAQD relied on a sample of 63 inspections for its Rule Effectiveness Study. Yet, thousands and thousands of inspections are conducted every year. MCAQD has acknowledged that it has the ability to identify the number of inspections that occurred during a given time period, and determine the number of inspections that resulted in an allegation of noncompliance. This data must be reviewed to determine whether the Rule Effectiveness Study sample is truly representative.[3]
>
> MCAQD previously made available similar inspection data from the June 2006 - August 2006 time frame during an October 10, 2006 meeting.[4] This data from 2,811 inspections showed that the simplistic compliance rate for both administrative and emissions-related requirements was 68%, far higher than the 33% compliance rate determined by MCAQD in the 63 set sample. These more representative numbers should be considered when determining rule compliance.
>
> Additionally, we believe it is also possible to determine which of those violations were administrative and which were emissions-related. We understand that the process of identifying administrative vs. emissions-related allegations of noncompliance is more labor intensive than the process of identifying the total number of inspections, and the total number of sites with violations. Accordingly, Home Builders and AGC would be willing to provide their assistance in any manner that would be helpful to MCAQD to accomplish this goal.

Response #8G:

MCAQD followed EPA guidance to determine a statistically adequate sample size for the Rule 310 rule effectiveness study.[5] The number of inspection sites in the sample size was determined by calculating the standard deviation of the initial ten random inspections. Then using EPA's recommended confidence interval (90 percent) and sample error (5 percent), MCAQD determined that sixty-three Rule 310 inspections were needed.

[3] Even this data must be reviewed, of course, with the caveat that drive-by compliant inspections may not show up in MCAQD's database, and therefore the compliance rate shown in the data is less than the true compliance rate.

[4] This 60% figure must also be viewed in context. The 32% of sites with documented violations were not completely uncontrolled.

[5] Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plan Base Year Inventories, Appendix D, U.S. EPA, EPA-452/R-92-010, November 1992.

Using the compliance data from MCAQD's Environmental Management System (EMS) would not be the same as inspections done under a rule effectiveness study. All inspections done for the rule effectiveness study were full scale level 2 inspections where every applicable rule subsection was inspected for compliance. Inspections entered into EMS include level 1 (onsite or offsite) and level 2 (onsite). The level 1 inspections are commonly done as spot inspections for violation follow-up, complaint inspections, or the next multiple inspection of a site. The follow-up inspections in particular tend to have a higher compliance rate because it is possible that only those issues found in violation previously will be checked during a follow-up inspection.

It is unclear what 33 percent compliance rate the commenter is referring to as the Rule 310 rule effectiveness study results showed a 49 percent compliance rate (revised to 51% in the April 2007 rule effectiveness study). The discrepancy between the 68 percent compliance rate cited by the commenter and the 49 percent compliance rate found in the rule effectiveness study is due to the reasons discussed above. Specifically, follow-up inspections have a higher compliance rate and including these in the data set will result in a higher overall compliance rate. The example below illustrates this point:

63 level 1 inspections with 49% non-compliance rate = 31 sites out of compliance
31 sites are re-inspected and found to be in compliance
94 total inspections (63 Level 1 + 31 follow-up inspections) with 31 site out of compliance = 32.98% non-compliance rate or 67.02% compliance rate.

The higher compliance rate found in follow-up inspections will increase the overall compliance rate.

Comment #8H:

> The inspection reports on which the Rule Effectiveness Study is based contain numerous errors and unsupported allegations. For example, none of the allegations concerning Rule 310, Sections 301 and 302, provides supporting documentation that demonstrate test methods were used to determine compliance. As a result, these unsupported statements cannot be used to allege noncompliance.
>
> Similarly, some of the allegations are not violations of Rule 310 at all. For example, one inspector noted that the stockpile on a particular site was wet, but wrote an NTC because the material "needs visible crust." See inspection # 609030. This allegation is unfounded. Under Rule 310, Section 308.6, a permittee has the option to keep an inactive stockpile moist or maintain a visible crust. For active stockpiles, maintaining a visible crust is not even a listed alternative, because it is not feasible.
>
> Some of the inspection reports allege violations for activities that are not regulated under Rule 310. One inspection report documents an NTC for opacity greater than 20% during sandblasting. See inspection # 609023. Sandblasting is not subject to Rule 310. Another alleges a violation resulting from tile cutting. See inspection # 609024. Tile cutting is not regulated under Rule 310; it is regulated by OSHA.
>
> Finally, Horne Builders and AGC concur with Maricopa County's decision to exclude administrative allegations in its emissions compliance methodology. However, the fact that these allegations are mentioned at all in the Rule Effectiveness Study implies rampant noncompliance**.**
>
> Again the facts do not bear this out. At least half of the administrative allegations concern dust control complaint phone numbers. During calendar 2006, MCAQD created a new phone number for dust complaints. The previous number continued to work, and continues to work to this day. The applicable rule requirement does not state that there can be only one current/accurate phone number. Therefore, these are not violations under any reasonable interpretation of the rule.

Response #8H:

Nineteen inspection reports showed Rule 310 Section 301 or 302 violations; fourteen of these inspection reports showed other emission violations. If a NOV was issued for a Rule 310 Section 301

opacity violation, a visible emissions evaluation was conducted and documented. The evaluation is documented on separate forms which are forwarded in the referral report to MCAQD's Enforcement Division; these were not included with the inspection reports provided to the commenter. Inspectors evaluate the surface under inspection for compliance with Rule 310 Section 302. The inspectors are able to determine through visual examination and depth analysis the severity of the unstabilized soil. When larger elements are not present in the first 3/8 inch, the surface will not pass the threshold friction velocity test. Furthermore, Rule 310 Section 302.3 requires that the owner/operator conduct the stabilization tests.

In regards to inspection report # 609030, MCAQD reviewed this inspection report and determined that a NTC was issued for an administrative violation for not posting the dust control plan. Because no emission violation was observed, this inspection was excluded from the violations used in calculating rule effectiveness. In reviewing the inspection report, MCAQD determined that an error was made in Table 3.4.1 in the Rule Effectiveness Study pertaining to inspection report #609030 (Permit Id E054400). MCAQD incorrectly noted in Table 3.4.1 the violation as Rule 310 Section as 308; the violation was actually a Section 401 violation. This error has been corrected in the April 2007 Rule Effectiveness Study.

In regards to inspection report # 609023, MCAQD reviewed this report and determined that the violation for exceeding opacity while sandblasting should have been a violation of Rule 312 not Rule 310. MCAQD has corrected the rule effectiveness study results accordingly. The correction results in an increase to rule effectiveness (or compliance rate) from 49% to 51%. This change will be been reflected in the April 2007 Rule Effectiveness Study report and in the calculated emissions for construction in the May 2007 emissions inventory report.

In regards to inspection report # 609024, the NTC was for block cutting not tile cutting and this was one of several NTCs and an NOV observed at this site. Block cutting is regulated under Rule 310 as a dust generating operation. The Rule 310 definition of dust generating operations is:

> Any activity capable of generating fugitive dust, including but not limited to, land clearing, earthmoving, weed abatement by discing or blading, excavating, construction, demolition, bulk material handling, storage and/or transporting operations, vehicle use and movement, the operation of any outdoor equipment, or unpaved parking lots. For the purpose of this rule, landscape maintenance and playing on or maintaining a field used for non-motorized sports shall not be considered a dust generating operation. However, landscape maintenance shall not include grading, trenching, or any other mechanized surface disturbing activities performed to establish initial landscapes or to redesign existing landscapes.

Finally, administrative violations with no observed emissions violation were excluded from the rule effectiveness calculation; thus, a discussion of administrative violations that were excluded, such as the dust control complaint phone number is outside of the scope of this report.

Comment #8I:

> Under Section 172(c) (3) of the Clean Air Act, the emissions inventory must be a "comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area..." Given the serious scientific flaws in MCAQD's Rule Effectiveness Study, the Draft Emissions Inventory cannot be a comprehensive, accurate, or current inventory of actual emissions from all sources.

Response #8I:
The rule effectiveness study was conducted in accordance with EPA guidance. MCAQD followed EPA guidance to determine a statistically adequate sample size for the Rule 310 rule effectiveness study and used a quality assurance supervisor and an observer for the study to assure consistency during the inspections. MCAQD reviewed all comments made pertaining to the rule effectiveness study and made adjustments where appropriate.

Comment #8J:

> Unpaved road emissions are a significant portion of the inventory. Unpaved road emissions, based on stale data and unsupported assumptions, are greatly underestimated. By MCAQD's own estimate, they constitute 9% of the PM_{10} inventory. Revising the Draft Emissions Inventory to accurately reflect construction emissions increases the unpaved road contribution to nearly 14%. Accordingly, it is critical that unpaved road emission estimates be based on comprehensive, accurate, and current information. Pechan's analysis identified a number of areas where the data sources for unpaved road estimates do not meet these criteria.
>
> For example, MCAQD does not explain the average speed estimate of 25 miles per hour. On rural unpaved roads, speeds are certainly higher. Pechan's analysis showed that changing the speed to 40 mph would increase unpaved road emissions to 10,697 tons per year. Because vehicle speeds greatly influence emission estimates, it is critical that MCAQD base its estimate for vehicle speeds on the best information available.
>
> Second, MCAQD uses average daily traffic volumes that were carried forward from a 1994 study (we understand this is the basis for the assumption on page 108 that the average annual traffic level is 4 vehicles per day). Data from 1994 are not current under any definition of the term, and cannot be used in a 2005 emissions inventory.
>
> In addition, the Draft Emissions Inventory assumes that the mileage of unpaved roads actually decreased slightly over the last several years. See page 108. As noted by Pechan, the Draft Emissions Inventory does not account for new unpaved roads added over the past several years.
>
> Finally, Pechan noted the rigorous methodology undertaken in Clark County to determine unpaved road emissions. Similar methodologies must be used here to create a comprehensive, accurate, and current estimate of unpaved road emissions. Revising the ADT numbers to be consistent with Clark County's would increase the unpaved road fugitive dust PM_{10} emissions reported in Table 5.4-10 from 20,954 kg/day to 36,762kg/day.

Response #8J:
As indicated in Response #8C, MAG used the best available data on unpaved roads to prepare the PM_{10} emissions estimates in the Draft 2005 Periodic Emissions Inventory for PM_{10}. The unpaved road mileage by traffic volume category (i.e., low – average of 4 average daily trips (ADT) and high – average of 120 ADT) was derived from a database developed for the MAG Serious Area PM_{10} Plan. The Serious Area PM_{10} Plan, that was approved by EPA on July 25, 2002, reduced the miles of unpaved roads to reflect legally-binding commitments made by local jurisdictions to pave and stabilize unpaved roads by 2006. To ensure that these unpaved road assumptions continue to be representative of the PM_{10} nonattainment area, MAG will work diligently to update the traffic counts on a sample of unpaved roads. MAG will also apply geographic information systems (GIS) and recent aerial photography to estimate the current unpaved road mileage. Since it will take several months to collect this data, it will not be available to recalculate unpaved road emissions for the final 2005 periodic emissions inventory; however, it will be available for use in estimating the 2007 unpaved road emissions for the Five Percent Plan for PM_{10}.

With respect to the speed used in estimating unpaved road emissions, 25 mph was assumed, because it is the speed limit that the Arizona Department of Transportation Motor Vehicle Division has officially established for roads that are not posted with a speed limit sign. While collecting traffic counts on a sample of unpaved roads, MAG will try to obtain typical vehicle operating speeds on the same roads. Although these speeds will not be scientifically-derived (i.e., through a formal travel time survey or speed study), the observations should provide a basis to determine whether the current assumption of 25 mph is reasonable.

Comment #8K:

> Every stakeholder involved in this process understands that it is critical that the emissions inventory represents actual and current conditions in the nonattainment area. We urge MCAQD to look at the available data objectively and without preconceptions. Only one reasonable conclusion can be drawn if that is done. Rule 310 effectiveness is much higher and construction emissions are much lower than reported in the Draft Emissions Inventory. Pechan has provided its best estimate, which was based on the available information, and took many of MCAQD's assumptions at face value. We ask that MCAQD use Pechan's methodology and results, incorporate modifications as necessary to reflect our additional comments, and revise the emissions inventory to be a "comprehensive, accurate, current inventory of actual emissions from all sources...."

Response #8K:

MCAQD carefully reviewed all comments received and modified the emissions inventory report where warranted. Each of Pechan's comments was addressed separately and responses are provided below in responses 9A-9L.

Comment #9A:

> The basic approach used by MCAQD to estimate 2005 construction activity PM10 emissions is to develop estimates of affected acreage by type of activity, and then to apply standard emission factors and average project durations by project type along with estimates of the effectiveness of existing fugitive dust control rules to estimate controlled 2005 emissions. This approach is a standard one for this source category, with some similarities to the methods used by EPA for its National Emissions Inventory. MCAQD uses estimates of acres permitted for construction during 2005, which is an improvement over some approaches which are based on the dollars spent on construction projects. Overall, Pechan has three concerns [*Note: included as comments 9A–C*] about the construction activity PM10 emission estimates in the 2005 MCAQD Inventory:
>
> 1. There is a computational error in the site preparation/land development emission estimate that results in the emissions for the Maricopa County portion of the PM_{10} nonattainment area for this project type being overestimated by 2,110 tons per year. The total acre-months in Table 3.3-20 for site prep/land development should be 4,905.6, not 39,244.6. The controlled PM_{10} estimate should be 301.6. Table 1 [*Note: not reproduced in this responsiveness summary*] provides a revised version of Table 3.3-20 with corrected values for site prep/land development.

Response #9A:

The one-month average duration for "site prep/land development" shown in Table 3.3-18 is a typographical error. The average duration used to estimate emissions from "site prep/land development" projects was eight (8) months and not the one (1) month shown in Table 3.3-18. A correction has been made in Table 3.3-18 to show the correct average duration for "site prep/land development" of eight (8) months. The typographical error did not affect the emission calculations as the emissions were estimated using the correct average duration.

Comment #9B:

> 2. The 2005 MCAQD Inventory applies an emission factor of 0.42 tons/acre-month to estimate road construction emissions. This value was selected based on information from the WRAP Fugitive Dust Handbook, which advises that a 0.42 tons/acre-month emission factor be used for worst case conditions. It is not clear from the information presented by MCAQD in its report why a worst case conditions

emission factor was deemed appropriate for road construction in this geographic area. For its 2002 PM_{10} emission inventory, a 0.11 tons/acre-month emission factor was applied to estimate uncontrolled road construction emissions. This emission factor change alone produces a 281 percent higher PM_{10} emission estimate for road construction than was estimated for the 2002 calendar year. This emission factor selection seems unjustified without evidence being presented by MCAQD for its selection.

Pechan reviewed recent PM_{10} emission calculations performed by the South Coast Air Quality Management District, where it is estimated that 25 percent of road construction is at the 0.42 tons/acre-month emission rate and 75 percent is at the 0.11 tons/acre-month rate, which is a net emission factor of 0.1875 tons/acre-month. It is suggested that MCAQD consider using the SCAQMD assumptions in its road construction emission estimates to estimate uncontrolled PM_{10} emissions. Making this revision would change the road construction controlled PM_{10} emission estimate in Table 3.3-20 to 5,281 from 11,831 tons per year, a reduction of 6,550 tons. This would change the Table 1 corrected PM_{10} controlled emission estimate to 28,631 tons per year (from 35,181 tons per year).

Response #9B:

MCAQD requested a citation or documentation from the commenter on the PM_{10} emission calculations performed by the South Coast Air Quality Management District (SCAQMD). The commenter was not able to provide specific documentation on the methodology but rather sent information from the California Air Resources Board which only describes the method in general terms and does not include the specific percentages used to apply the 0.42 tons versus the 0.11 tons emissions factor for road construction. It is also important to note that the SCAQMD work cited assumed the construction emission factors included the effects of typical control measures such as routine watering.[6] Whereas, MCAQD assumed the emission factor values were uncontrolled and applied a 90% control efficiency. If MCAQD had adopted the entire SCAQMD methodology as the commenter requested, overall emissions from this source category would have increased significantly.

MCAQD rational for selecting the 0.42 tons/acre-month emission factor for road construction was based on the following excerpts in the WRAP Fugitive Dust Handbook:

1. The WRAP Fugitive Dust Handbook (Section 3.2.4 Road Construction) states on page 3-6:
   Almost all roadway construction involves extensive earthmoving and heavy construction vehicle travel, causing emissions to be higher than found for other construction projects. The PM_{10} emissions produced by road construction are calculated using the BACM recommended emission factor for heavy construction[7] and the miles of new roadway constructed.

2. On page 3-7, the WRAP Fugitive Dust Handbook further states:
   The BACM worst case scenario emission factor of 0.42 tons/acre-month is used to account for the large amount of dirt moved during the construction of roadways. Since most road construction consists of grading and leveling the land, the higher emission factor more accurately reflects the high level of cut and fill activity that occurs at road construction sites.

In its 2002 PM_{10} emission inventory, MCAQD used an emission factor of 0.11 tons/acre-month to estimate uncontrolled road construction. MCAQD strives to use improved estimation methods where available and practical in order to update and improve emission estimates. Because the WRAP

[6] California Air Resources Board, Emissions Estimation Methodology, Section 7.7 (Building Construction Dust) and Section 7.8 (Road Construction Dust), Sept. 2002 and August 1997, respectively.
[7] Midwest Research Institute, 1999. Estimating Particulate Matter Emissions From Construction Operations, Kansas City, Missouri, September.

Fugitive Dust Handbook was published in September 2006, after the 2002 PM_{10} emissions inventory but prior to finalizing the 2005 PM_{10} emissions inventory, MCAQD chose to use the road construction emission factor (0.42 tons/acre-month) recommended by WRAP in the Fugitive Dust Handbook to estimate road construction emissions.

MCAQD researched PM_{10} emission calculations performed by the SCAQMD and was unable to locate emissions estimation methodology specifically from SCAQMD for road construction emissions. The only reference to this methodology is in the WRAP Fugitive Dust handbook and in the California Air Resources Board (CARB) building and road construction dust estimation methodology. Both indicate that the SCAQMD applied 0.42 tons/acre-month emission rate and 0.11 tons/acre-month rate to both road and building construction. Neither WRAP nor CARB showed the specific percentages used to apply the 0.42 tons versus the 0.11 tons emissions factor for road construction. Further, the SCAQMD and CARB work both assumed the construction emission factors included the effects of typical control measures such as routine watering.[8] Adopting the entire SCAQMD methodology would have significantly increased the overall emissions from this source category.

EPA used the 0.42 tons/acre-month emission factor to estimate emissions from road construction for the 1999 and 2002 National Emissions Inventory (NEI).

EPA's Procedures Document for National Emissions Inventory, Criteria Air Pollutants 1985-1999 states:

> An emission factor of 0.42 tons/acre/month is used to account for the large amount of dirt moved during the construction of roadways. Since most road construction consists of grading and leveling the land, the higher emission factors more accurately reflects the high level of cut and fill activity that occurs at road construction sites.[9]

In 2004, E.H. Pechan & Associates used the 0.42 tons/acre-month PM_{10} emission factor (adjusted to account for conditions in Yuma including correction parameters for silt moisture level and silt content) to calculated road construction emissions in the 1999 and 2016 Emission Estimates for the Yuma, Arizona PM_{10} Nonattainment Area Maintenance Plan, prepared for Arizona Department of Environmental Quality[10]

Because MCAQD was unable to locate detailed documentation of the SCAQMD approach and because the 1999 and 2002 NEIs, the WRAP Fugitive Dust Handbook, and E.H. Pechan & Associates all used the 0.42 tons/acre-month for road construction, MCAQD believes that the 0.42 tons/acre-month is an appropriate emission factor. However, since Clark County Department of Air Quality and Environmental Management used an average emission factor of 0.265 tons/acre/month ([0.11 + 0.42] / 2) for construction projects that sometimes include cut and fill areas, large-scale earthmoving activities, and/or heavy traffic volumes and other times do not, MCAQD will use the Clark Co. approach for road construction activities and revise road construction emissions accordingly. [11]

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[8] California Air Resources Board, Emissions Estimation Methodology, Section 7.7 (Building Construction Dust) and Section 7.8 (Road Construction Dust), Sept. 2002 and August 1997, respectively.

[9] U.S. EPA, Procedures Document for National Emission Inventory, Criteria Air Pollutants 1985-1999, EPA-454/R-01-006, March 2001, p. 4-291.

[10] Appendix: Technical Support Document: Yuma Natural Events Action Plan, January 2004. 1999 and 2016 Emission Estimates for the Yuma, Arizona, PM10 Nonattainment Area Maintenance Plan, Final Report, Prepared for: Arizona Department of Environmental Quality, Prepared by E.H. Pechan & Associates, Inc., June 2003, Contract No. 98-0159, Pechan Rpt. No. 03.06.004/9412.001 (Rev.), p. 22.

[11] PM_{10} SIP Plan for Clark Co., Appendix B: Methodology, Emission Factors, and Emission Estimates, June 2001, p. B-59.

Comment #9C:

3. One of the key variables in the controlled PM_{10} emission estimate for road construction is the estimated rule effectiveness. Rule effectiveness in this case is a measure of the Rule 310-Fugitive Dust compliance rate in the area. The rule effectiveness guidance available from EPA during the 1990s suggested that a default rule effectiveness assumption of 80 percent be used in most cases to estimate compliance rates in cases where data were not available to estimate this value quantitatively. More recent guidance from EPA removes the previous recommendation for use of an across the board 80 percent default value. EPA's revised rule effectiveness guidance provides inventory preparers with lists of factors that are most likely to affect RE and ranks these factors in a priority order. For nonpoint sources like construction activity, EPA provides three ranges: 86 to 100 percent, 70 to 85 percent and below 70 percent with associated importance factors to use in determining the appropriate RE to apply.

As part of its 2005 inventory development, MCAQD performed its own RE study to quantify compliance with the fugitive dust rules in the Maricopa County air quality regulatory program. One portion of this RE study examined earthmoving sources. For the earthmoving site RE study, site inspections were performed for 63 sites. MCAQD used the information from these special site visits to assign each site as either being fully compliant (100% RE) or non-compliant (0% RE or uncontrolled). The MCAQD RE study for earthmoving sites found that 31 of 63 inspected sites with no emission violation, and 32 of 63 with observed violations. This information was used to compute an overall RE value of 49 percent, which was used in the PM_{10} emission calculations for this source category.

Pechan staff reviewed the inspection results for all of sites that either received a Notice to Correct (NTC) or a Notice of Violation (NOV) and matched that information with the applicable project types, which were described in the inspection reports as not being fully compliant with Rule 310. We then made judgments about which emission sources within the site were uncontrolled and adjusted only those sources. This resulted in a scoring system that assigned values in between zero and 1 when warranted by the information provided by the site inspectors. Table 2 shows how the site inspection reports were evaluated. The columns in this table are the site inspection report numbers. For each site inspection, the letters V and C are used in Table 2 to indicate the source type (project type) associated with any violation (V) or notice to correct (C). There were three sites with notices of violation that indicated widespread violations to the extent that the site was deemed fully uncontrolled (site numbers 609071, 609005, and 609007). For all other sites, the PM_{10} emission rates were estimated to be uncontrolled at the sites where either a V or a C is indicated in that row. As an example, if 10 sites had a V or C for site prep/land development, then the RE was estimated to be 10/63 times zero plus 53/63 times 100 percent, or 84 percent. The denominator of 63 is the total number of earthmoving sites inspected during the MCAQD RE study. In this way, a rule effectiveness value is computed for each project type. Then, that project type-specific RE value is used to estimate 2005 emissions consistent with the methods employed by MCAQD in section 3.3.9 Construction of the 2005 Periodic PM_{10} Emission Inventory.

Pechan's revised .PM_{10} emission estimates for the construction category using the above methods are provided in Table 3 *(not included in this responsiveness summary)*. Pechan's revised PM_{10} emission estimate for construction activity in Table 3 is 10,059 tons per year, significantly lower than the MCAQD reported value. (This table uses the higher 0.42 tons/acre-month emission factor for road construction.) If the lower SCAQMD composite emission factor of 0.1875 were used, this would change the resulting construction activity PM_{10} estimate to 7,882 tons per year.

Response #9C:

The project type relates to the type of construction (residential, commercial, road construction, etc.) and should not be confused with the dust generating activities (bulk material hauling, trackout, unpaved haul roads, open storage piles, disturbed surfaces etc.) that occur on a construction site or the types of violations (trackout > 50 feet, opacity > 20%, ineffective trackout control device, etc.) observed at a given construction site or identified in an inspection report. MCAQD determines the project type from "Description of Project" information submitted on the Application for Dust Control Permit.

Pechan interpreted violations identified on inspection reports as emission sources and then incorrectly allocated these violations to project types. For example, inspection report #609073 identified the following two NOVs:

- Trackout on Central from site west exit point extends southerly for > 250 feet.
- Ineffective trackout control device at time of inspection earthmoving activities disturbed more (than) 2 acres.

Pechan incorrectly interpreted these NOVs as "site prep/land development" and "temporary storage yard" (see Table 2 on page 6 of Pechan comment letter). This was actually a commercial construction project and not "site prep/land development" or "temporary storage yard".

Further, Pechan also created two project types that are not identified separately in the emissions inventory: trackout and opacity. These are actually types of violations observed during inspections. Pechan identified in Table 2, 17 Notices of Violation/Notices to Correct for "trackout" and 6 Notices of Violation/Notices to Correct for "opacity", yet Pechan failed to include these in their revised NOV/NTC count or revised emission estimates in Table 3.

Comment #9D:

> Because the information in the rule effectiveness study inspection reports is organized by Rule 310 section rather than by emissions generating subcategory, an alternate analysis was performed where the NOVs and NTCs were organized by the Rule 310 sections. This analysis is shown in Table 4 (*not included in this responsiveness summary*). This table was constructed by taking the information in the rule effectiveness study inspection reports and noting wherever the report said that a specific rule NOV or NTC occurred. The level-of-detail provided in Table 4 for the Rule 310 requirements is designed to match the level-of-detail provided in the inspection reports.
>
> Table *5* (*not included in this responsiveness summary*) summarizes the results of this alternate analysis. Table 5 summarizes the total NOV plus NTCs by rule number as well as the occurrences of NOVs and NTCs separately. Then, in the right-most columns of this table, the number of occurrences is used to compute a non-compliance rate for each rule number that had an NOV or an NTC. For example, Table 5 shows that about 8 percent of inspected sites had either an NOV or an NTC for the opacity limits for dust generating operations (Section 301 of Rule 310). Therefore, for this specific section of Rule 310, the rule effectiveness survey showed a 92 percent compliance rate, and an 8 percent non-compliance rate.
>
> For the eight rule sections in Table *5* where there were one or more NOVs/NTCs, the noncompliance rates were averaged to estimate an overall non-compliance rate of 13 percent. The non-compliance rates by rule section range from a low of 1.5 percent for unpaved haul/access piles to a high of 27 percent for stabilization. This average rule effectiveness value of 87 percent (13 percent non-compliance) computed using this alternate methodology is very close to the 84 percent estimate provided above, and serves as confirmation of the revised PM_{10} emission estimates provided in the right-most column in Table 3.

Response #9D:

Pechan reviewed the 63 inspection reports from the Rule Effectiveness Study and totaled the multiple violations observed at each construction site according to the specific sections of Rule 310. Pechan listed ten different sections of Rule 310 in Table 5 (see page 9 of Pechan's comment letter). Pechan then calculated a noncompliance rate for each section of the rule and suggests that averaging the noncompliance rate for each section estimates an overall noncompliance rate. However, this approach represents the average noncompliance rate for each section of the rule rather than an overall noncompliance rate. In other words, the rate that any one section of the rule had been violated.

Based on Pechan's count of the different rule sections in Table 4, 32 of 63 inspections (51%) resulted in a notice of violation or notice to correct. The 32 inspections which resulted in notices of violations or notices to correct had 66 separate Rule 310 section violations.

Rule effectiveness is reflected in the non-compliance rates determined by dividing the number of non-complying facilities by the number inspected.

MCAQD estimated rule effectiveness by conducting a statistically significant number of randomly selected inspections (63) and determining the number of inspected sites with no observed violation (32 inspections (of 63 total) had no observed violation = 51%). Conversely, Pechan's approach estimates the number of times each section of the rule was violated. Their approach measures the non-compliance rate of individual sections of Rule 310 rather than the non-compliance rate of Rule 310. Their approach simple does not represent an overall rate of compliance; it represents an average rate of non-compliance with individual section of Rule 310.

Further, Pechan miscounted the number of violations identified on the inspection reports. The total of all NOV and NTC is short by 13 violations; thus, 79 violations were identified in the 32 inspections with observed violations. The violations miscounted by Pechan are identified in the table below:

Inspection Number	Number of Violations Identified in Inspection Report	Number of Violations Listed in Pechan's Table 4	Number of Violations Not Counted by Pechan
609071	4	2	2
609005	6	1	5
609007	5	4	1
607450	6	4	2
607448	5	3	2
605737	2	1	1
Total	28	15	13

Comment #9E:

> Any calculation of 5 percent per year emission reductions for the PM_{10} nonattainment area should use an average, or typical year emission estimate for windblown dust emissions, so more information is needed in the ENVIRON analysis, or the body of the report, about the representativeness of the PM_{10} emission estimate computed using 2005 meteorological data. One of the weaknesses of the windblown dust inventory model application is the lack of accounting for rainfall (page 2-8 of Appendix 3-3). In addition, it is suggested that daily PM_{10} emissions be presented in the appendix for the specific days when wind speeds exceeded 20 miles per hour and there were positive emissions for this source type. The 2005 windblown dust emissions estimate for the PM_{10} nonattainment area is 1,086 tons per year.

Response #9E:

Since the January 2007 draft report was published, the model has been revised to incorporate the effects of rainfall. Five years (2001–2005) of hourly precipitation data from approximately 200 monitoring stations (throughout Maricopa and Pinal Counties) was provided by Maricopa County Flood Control district, and has been incorporated into the model input data sets.

The comment re: a 20-mph threshold is unclear. As discussed in the January 2007 draft report, the windblown dust inventory has been developed using a grid-based modeling system. Dust emissions from wind erosion are determined from the gridded wind speeds and surface characteristics. Windblown emission are only possible when wind speeds exceed a threshold wind speed determined by the aerodynamic surface roughness lengths of the underlying surface. These vary by landcover type, and so the threshold also vary. However, the draft report does summarize a previous version of

the modeling system developed for WRAP during Phase I of the WRAP project. That version of the model did use a constant threshold corresponding to a 20-mph wind speed (at a height of 10 m).

Comment #9F:

> Another concern with the approach used by ENVIRON is its suitability for estimating windblown dust PM_{10} emissions for an analysis of this geographic scale. The RMC windblown dust model "is designed to estimate fugitive windblown dust emissions for regional air quality modeling." Is the model valid for smaller scale applications like this one where the relative accuracy of the estimate is more important? Has the model been validated for PM_{10}? It seems likely that this model has been designed primarily to estimate fine particulate windblown dust emissions over large geographic regions and may not be a good predictor of PM_{10} emissions for a State Implementation Plan/regulatory analysis.

Response #9F:

The ENVIRON windblown dust model was indeed developed for application to regional air quality modeling studies. However, this limitation is actually due to the various databases used as inputs. For the modeling work conducted for the Western Regional Air Partnership (WRAP), the inventory was required to cover the entire conterminous United States. Because of this, the underlying GIS databases (i.e. soil characteristics and land use/land cover [LULC]) were somewhat lacking in detail and resolution, primarily due to limited time and resources available for their development. The emission estimation methodology is valid regardless of the scale of the final inventory as has been validated through field studies using wind tunnels. It should be noted that the model has been successfully applied to other nonattainment-area scale studies.[12] In fact, the current inventory developed for Maricopa County is considered by the model developers to be better and more applicable than that of the WRAP due to the use of local high resolution and detailed LULC data. Additionally, the methodology is designed to estimate PM_{10} directly; $PM_{2.5}$ is apportioned from the estimated PM_{10} dust emissions.

Comment #9G:

> The ENVIRON report also lacks clarity in describing how the emission calculations were performed for each land use type, which makes it difficult to determine whether the emission estimates are correct. For example, page 2-9 of the ENVIRON report discusses surface disturbance assumptions used in the windblown dust model that conflict with what is said later in the report on page 4-3. Some of the key assumptions mentioned on page 4-3, like those about the fraction of barren lands that are disturbed (30 percent) and the fraction of shrublands that are disturbed (8 percent) are provided with no back-up information. These assumptions and the assumptions about threshold friction velocities have a substantial effect on resulting emission estimates by land use type and should be justified and referenced.

Response #9G:

A concise summary of the computational steps required has been included in the revised version of the report summarizing the modeling results, along with further details concerning the original and/or derivation of threshold friction velocities for individual land use types. To summarize:

1) The model calculates the threshold surface friction velocity as a function of the surface roughness lengths for each landuse type in each grid cell using the relationship displayed in Figure 2-1, and the assumed roughness lengths by landuse type (listed in Table 3-2).
2) The surface friction velocity is calculated from the relationship displayed in page 2-2, the assumed roughness lengths by landuse type (Table 3-2) and the gridded 10-meter wind speeds. When the surface friction velocity exceeds the estimated threshold from step 1) the model

[12] See (e.g.) "Development of a Wind Blown Fugitive Dust Model and Inventory For Imperial County, California", ENVIRON International Corp., May 2004.

calculates PM_{10} dust emissions using the relationships shown in Figure 2-2 as a function of the wind speed and soil texture.
3) Any adjustments for agricultural lands are then computed.
4) The final step involves summing all the PM_{10} dust emissions in each grid cell for each hour. (Note that in any given grid cell, the percentages of the various landuse and soils are available for use in estimating the dust emissions).

Comment #9H:

In the end analysis, ENVIRON estimates PM_{10} emissions for just four land use types: (1) agricultural lands, (2) grassland, (3) shrubland, and (4) barren lands. Urban lands are estimated to have no windblown dust emissions. When the relationship between land area, land use type and PM_{10} emissions is compared (Table 3.3 and Table 5-3), the relative PM_{10} emission strengths (in tons per square kilometer) are: barren land (1.14 tons per square km), shrubland (0.25 tons per square km), and agricultural land (0.0078 tons per square km).

Response #9H:

The windblown dust emission estimation methodology relies on the relationship between threshold surface friction velocity and aerodynamic surface roughness lengths. Further, the surface roughness lengths are a function of the landuse. Clearly, these roughness lengths exhibit a range of values even for the same nominal landuse type. Unfortunately, a database of specific surface roughness lengths for the study are was not available, so assumed values were used for each of the general landuse types in the GIS data used. The assumed roughness lengths were chosen from a range of values reported in the literature. Based on these values, only those landuse types that are considered in the model would result in threshold surface friction velocities that would typically be observed in nature. Note however, that although urban lands are not considered, the LULC data used for the current project included such detail within the Phoenix metro area as residential and commercial buildings under construction. Therefore, although urban land, per se, is not considered, dust emission are generated with in the metro, or urban, area of Phoenix.

Comment #9I:

The 2002 windblown dust PM_{10} emission estimate for the nonattainment area was 10,505 tons per year. However, the 2002 PM_{10} emission estimate used a threshold wind speed of 15 miles per hour and the 2005 analysis assumed a threshold wind speed of 20 miles per hour. The 2005 emission inventory report should explain why a higher threshold wind speed was used in 2005 than previously. Is this based on research within the Phoenix area on the wind speed versus emissions relationship?

Response #9I:

The 2002 windblown dust emission estimates cited by Pechan (10,505 tons per year) were developed prior to the development of the model used in the current application. The previous emission estimates were based on a very simplistic modeling approach which indeed used a constant threshold surface friction velocity. Contrary to Pechan's implication, the current model does not use a fixed threshold (see response above). In addition, the previous estimate of 10,505 tpy of windblown PM_{10} dust included numerous assumptions and flawed wind tunnel study data and should be disregarded.

Comment #9J:

Paved road emissions were estimated using EPA's AP-42 equations. Area-specific inputs to this equation are the paved road silt loadings and average weight of the vehicle fleet traveling on the roads. The values used for silt loadings varied by freeways, high-traffic roads, and local and low traffic roads. The values for these silt loading values are documented in the MCAQD 1999 Serious Area Particulate Plan and appear to be reasonable values, and are also relatively close to the AP-42 default. The average vehicle weight assumption of 3 tons per vehicle is a default value that essentially eliminates vehicle weight from factoring into the emission factor calculation. This is generally acceptable practice. However, a more locally-specific value could be derived based on the VMT mix used in calculating the onroad exhaust emissions, by assigning an average vehicle weight to each vehicle type and weighting these values according to the VMT mix. The one significant area of concern in the paved road emissions calculations, though, is the improper calculation of $PM_{2.5}$ emissions from the PM_{10} emissions. In the MCAQD 2005 inventory, the $PM_{2.5}$ paved road emissions are calculated by multiplying the PM_{10} emissions by 0.15. Instead, the $PM_{2.5}$ emissions should be calculated by using the same AP-42 equation used to calculate the PM_{10} emissions, but using the $PM_{2.5}$-based particle size multiplier and the $PM_{2.5}$-based correction factor that accounts for exhaust, brake wear, and tire wear. Using the appropriate equation and factors results in $PM_{2.5}$ emissions for the PM_{10} modeling area of approximately 1,000 kg/day, yields a reduction of about 5,000 kg/day from the 6,360 kg/day value reported in Table 5.4-6.

The AP-42 equation for paved roads also includes an adjustment to account for the effects of precipitation on paved road emissions. MCAQD does not include this adjustment. Based on 18 days in 2002 with greater than 0.0 1 inches of precipitation, the PM emissions from paved roads would be reduced by approximately 1.4 percent. This would change the Table 5.5-1 PM_{10} annual emissions from paved road fugitive dust for the PM_{10} nonattainment area from 13,783 tons per year to 13,590 tons per year. Unless the Phoenix area experienced significantly more precipitation than this in 2005, it is not expected that applying the precipitation correction would significantly change the calculated paved road emissions.

Response #9J:

MAG has recalculated $PM_{2.5}$ emissions using the same equation (i.e., AP-42, Section 12.2.1, Equation (2)) used to estimate PM_{10} paved road dust emission factors, but substituting the new $PM_{2.5}$ particle size multiplier shown in AP-42, Table 13.2-1.1. This reduces $PM_{2.5}$ emissions to 581 kilograms per day for the PM_{10} modeling area, compared with the 6,360 kg/day reported in Table 5.4-6 of the draft inventory. All $PM_{2.5}$ paved road dust emissions in the 2005 inventory will be revised to be consistent with this reduced estimate for the PM_{10} modeling area. It is important to note that $PM_{2.5}$ emissions are included in the inventory to meet EPA periodic reporting requirements. This change has no impact on the PM_{10} emissions for paved roads that will be used in the Five Percent Plan for PM_{10}.

As previously stated, MAG used AP-42, Section 12.2.1, Equation (2), to estimate PM_{10} emission factors for paved road dust. In that equation, MAG applied 36 days as the precipitation correction term, P, for the 365 days in 2005. P, which represents the number of days with at least 0.01 inches of precipitation, was derived from an analysis of 2005 measurements at meteorological stations located throughout Maricopa County. A precipitation correction term based on this actual 2005 data is considered to be more accurate in estimating 2005 paved road dust emissions than the 2002 P value of 18 days, proposed by the commenter.

Comment #9K:

Unpaved road emissions were also calculated using the AP-42 emission factor equation. This equation for unpaved road emissions includes terms for surface material silt content, average vehicle speed, and surface material moisture content. The values used by MCAQD are all reasonable, however, no explanation for the use of these values is provided. The average speed value modeled of 25 miles per hour should be based on actual data, as this can have a significant impact on the emissions. For example, changing the speed to 40 mph would cause the unpaved road PM_{10} emissions to increase by about 26 percent. This would change the Table 5.5-1 PM_{10} annual emissions from unpaved road fugitive dust for the PM_{10} nonattainment area from 8,490 tons per year to 10,697 tons per year. In contrast, modeling these

emissions at a speed of 15 mph would result in a decrease in PM_{10} annual emissions to 6,537 tons per year. Another general concern is that the emission totals for the PM_{10} modeling area reported in Table 5.4-10 cannot be duplicated using the AP-42 equation and the stated inputs. Applying the information provided by MCAQD to the AP-42 unpaved road equation results in PM_{10} emissions that are about 11 percent greater than those reported in Table 5.4-10, or 23,226 kg/day.

Activity for unpaved roads is calculated by multiplying an average daily traffic (ADT) volume by unpaved road mileage. MCAQD uses an ADT of 4 vehicles per day on low traffic roads and 120 vehicles per day on high traffic roads. This is an assumption that appears to be carried forward from the 1994 PM inventory for Maricopa County. This value is an assumption that does not appear to have been based on any actual data. The unpaved road emissions are directly proportional to the ADT values. Thus, if the low traffic ADT is actually 40 rather than 4, then the emissions from the low traffic roads would be increased by a factor of 10. This would result in a change to the Table 5.4- 10 total unpaved road PM_{10} fugitive dust emissions in the modeling area from 20,954 kg/day to 48,053 kg/day. Thus, it is important that this ADT value have some basis in actuality.

The unpaved road mileage used in these calculations is also of concern. The 2005 unpaved road mileage for low traffic roads of 1,129.2 miles is essentially the same as the values used for 2001 through 2006 in the 1999 Serious Area PM_{10} Plan. The mileage modeled for the 2005 inventory on high traffic unpaved roads of 224.3 represents a decrease of 54 miles from the 2006 projections in the 1999 Plan. The 2005 inventory indicates that this represents the reduction in unpaved road mileage due to the control measures in the 1999 Plan to Reduce-Particulate Emissions from Unpaved Roads and Alleys. However, the documentation does not state how many miles of roads have assumed to have been paved. One of the appendices to the Revised MCAQD 1999 Serious Area Particulate Plan for PM_{10} for the Maricopa County Nonattainment Area lists commitments by several jurisdictions in the MCAQD area to pave, gravel, or stabilize emissions from unpaved roads. This list does not provide sufficient information to calculate the mileage reduced from unpaved roads. Additionally, there is no indication that growth in unpaved roads since the time of the 1999 plan has been factored into this analysis. With the growth in population and VMT in the MCAQD area, it is unrealistic to expect that the mileage of unpaved roads in the area has not increased since 1999.

As with the paved roads, the AP-42 documentation includes a precipitation adjustment. No adjustment for precipitation was applied to the unpaved roads, but, again, this is not expected to have a significant impact.

Response #9K:

As indicated in Responses #8C and #8J, MAG used the best available data on unpaved roads to prepare the PM_{10} emissions estimates in the Draft 2005 Periodic Emissions Inventory for PM_{10}. The unpaved road mileage by traffic volume category (i.e., low – average of 4 average daily trips (ADT) and high – average of 120 ADT) was derived from a database developed for the MAG Serious Area PM_{10} Plan. The Serious Area PM_{10} Plan, that was approved by EPA on July 25, 2002, reduced the miles of unpaved roads to reflect legally-binding commitments made by local jurisdictions to pave and stabilize unpaved roads by 2006. To ensure that these unpaved road assumptions continue to be representative of the PM_{10} nonattainment area, MAG will work diligently to update the traffic counts on a sample of unpaved roads. MAG will also apply geographic information systems (GIS) and recent aerial photography to estimate the current unpaved road mileage. Since it will take several months to collect this data, it will not be available to recalculate unpaved road emissions for the final 2005 periodic emissions inventory; however, it will be available for use in estimating the 2007 unpaved road emissions for the Five Percent Plan for PM_{10}.

As indicated in Response #8J, the 25 mph speed on unpaved roads was assumed, because it is the speed limit that the Arizona Department of Transportation Motor Vehicle Division has officially established for roads that are not posted with a speed limit sign. While collecting traffic counts on a sample of unpaved roads, MAG will try to obtain typical vehicle operating speeds on the same roads.

Although these speeds will not be scientifically-derived (i.e., through a formal travel time survey or speed study), the observations should provide a basis to determine whether the current assumption of 25 mph is reasonable.

MAG used AP-42, Section 12.2.2, Equation (1b), to estimate PM_{10} emission factors for unpaved road dust. As documented on Page 116 of the inventory, the inputs to this equation were mean vehicle weight (3 tons), surface material silt content (11.9%), average vehicle speed (25 mph), and surface material moisture content (0.5%). The mean vehicle weight and surface moisture content represent EPA default values. The source for the speed assumption is discussed above. The average silt content was derived from analysis of soils in Maricopa County for the 1994 Regional PM_{10} Emission Inventory. In calculating unpaved road dust emissions, MAG also applied Equation (2) which corrects the particulate emission factor for precipitation. MAG applied 36 days as the precipitation correction term, P, for 2005. P, which represents the number of days with at least 0.01 inches of precipitation, was derived from an analysis of 2005 measurements at meteorological stations located throughout Maricopa County. The commenter should be able to replicate the unpaved road emissions if the correct 2005 precipitation correction factor is applied.

Comment #9L:

> Due to the sensitivity of the unpaved road fugitive dust emissions to the average daily traffic volume used, information on how this value was derived in other comparable areas in the Southwest was investigated. The Clark County, Nevada, PM_{10} SIP was prepared in June 2001 and estimates the ADT for unpaved roads based on traffic count data. The Clark County SIP indicates that traffic counts were taken on a representative sample of the unpaved roads in the area and these samples were then used to predict daily traffic volumes on the remaining unpaved roads. The roads were divided into four volume categories. For the first three categories, the average of the daily traffic volume range was modeled as the ADT for the roads in each category, resulting in ADTs of 25, 75, and 125 for these three categories. The fourth category included unpaved roads with ADTs estimated to be greater than 150. Because the upper end of this range was unknown, the ADT for this category was set to 15 1. This method of estimating ADT based on actual traffic counts is more robust than the Maricopa County method which relies on model assumptions of 4, 120, and 120 vehicles per day on low, medium, and high ADT roads, respectively. Although the MCAQD documentation does not indicate the ADT volume range for the low, medium, and high ADT unpaved road categories, a conservative assumption could be made that these roads fall in a less than 50 ADT volume category. Making the argument that the lowest ADT category of unpaved roads in Maricopa County should be comparable to those in Clark County, based on proximity and comparable geographic conditions, then it would be reasonable to assume that the ADT for the low ADT category should be increased to 25 vehicles per day. Such an assumption would increase the unpaved road fugitive dust PM_{10} emissions reported in Table 5.4-10 from 20,954 kg/day to 36,762 kg/day in the PM_{10} modeling area.

Response #9L:

As indicated in Responses #8C, #8J and #9K, MAG used the best available data on unpaved roads to prepare the PM_{10} emissions estimates in the Draft 2005 Periodic Emissions Inventory for PM_{10}. The unpaved road mileage by traffic volume category (i.e., low – average of 4 average daily trips (ADT) and high – average of 120 ADT) was derived from a database developed for the MAG Serious Area PM_{10} Plan. To ensure that the traffic volumes on unpaved roads continue to be representative of the PM_{10} nonattainment area, MAG will work diligently to update the traffic counts on a sample of unpaved roads. Since it will take several months to collect this data, it will not be available to recalculate unpaved road emissions for the final 2005 periodic emissions inventory; however, it will be available for use in estimating the 2007 unpaved road emissions for the Five Percent Plan for PM_{10}.

Comment #10:

We have given a preliminary review of the 2005 Periodic Emissions Inventory for PM_{10} for the Maricopa County, Arizona, Nonattainment Area; and have the following questions concerning the assumption of construction activities occurring only 5 days per week.

EPA has found in Las Vegas, Nevada that activities for residential construction occur 6 days per week on non union sites (70%) and 5 days for union sites (30%). Commercial construction occurs 6 to 7 days per week. Road construction activities occur 7 days per week with most of the road construction activities occurring at night in the summer months. EPA finds that the activities in Las Vegas are similar to the activities in Maricopa County. Although the emissions calculated for these activities will probably not change, since the emission factors are based upon acres disturbed, number of homes built, number of miles of roads constructed, etc; EPA concern is that Construction and Mining Equipment may have been underestimated with the assumption of only 5 days of construction activities. If there are laws, ordinances, or rules that prohibit construction to just 5 days, then the assumptions in the inventory are correct. EPA asks that the number of days of construction activities be reviewed and if found to occur above 5 days, to adjust the emissions in the Construction and Mining Equipment category.

EPA has found that there are some emissions that were not included in the draft inventory but are stated to be included in the final inventory. They were: ammonia emissions for fertilizer applications, cattle feedlots and dairies, and $PM_{2.5}$ emissions from windblown dust.

Response #10:

MCAQD Dust Compliance Division staff acknowledge that residential and commercial construction may occur 6 or 7 days/week and roadway construction may occur 7 days/week. However MCAQD does not track this information and the activity can vary depending on the project. MCAQD chose to modify it's assumption regarding the number of days per week that construction activities occurs from 5 days per week to 6 days per week. The effect of this modification has no effect on annual emission calculations, but results in lower daily PM_{10} emissions from construction. This change is reflected in the May 2007 emissions inventory report.