Meeting Summary
Agricultural Best Management Practices Technical Workgroup
Wednesday, November 24, 2009, 1:30 p.m.
Arizona Department of Environmental Quality
Conference Room 3175 A & B
1110 W. Washington St., Phoenix, Arizona 85007
(revised December 8, 2009)

Discussion Points:

1) **Welcome; Introductions & Review of Agenda**
Co-chairs Earl Petznick Jr. and Kevin Rogers welcomed members of the Technical Workgroup and members of the public to the meeting. Technical Workgroup members and all public attendees introduced themselves.

2) **Discussion of Outstanding Action Items**
Nancy Wrona, ADEQ, discussed the status of the rule comparison table. The comparison table looks at the BMP rule for Maricopa County, San Joaquin Rule 4550, Imperial County rules 806 and 420, South Coast rules 403, 403.1, 1127, and 1186, and the proposed Maricopa County rule 310.01. Ms. Wrona also provided an overview of how the San Joaquin Valley Air Quality District enforces violations of conservation management practices (CMPs). San Joaquin uses tiered penalties, with progressive monetary penalties assessed to those who violate CMPs within a three year period. Only in extreme cases would criminal sanctions be sought, such as in imminent and substantial endangerment to public health and/or safety occurs. The first violation incurs a $300 penalty; the second (within three years) a $600 penalty; and the third violation (within three years) incurs a $1200 penalty.

3) **Discussion of BMP Development for Poultry Operations**
Clint Hickman, representing poultry operations, provided an overview of the draft BMPs for poultry operations. Mr. Hickman described the processes of poultry farming that lend to the BMPs for poultry operations.

4) **Discussion of BMP Development for Swine Operations**
Marguerite Tan, representing the swine industry, provided an overview the draft best management practices (BMPs) for swine operations. Ms. Tan described the BMPs and explained some of the differences that are unique to swine operations.

5) **Discussion of BMP Development for Crop Operations**
Cheryl Goar, Executive Director of the Arizona Nursery Association, representing the crop segment of the Technical Workgroup, proposed the addition of two new BMPs for crops: transplanting and shuttle system to reduce the number of passes in a filed. Phillip Bashaw, Government Relations Manager of the Arizona Farm Bureau Federation, also representing the crop segment of the Technical Workgroup, proposed a new BMP for "leveling" to contain dust when leveling a field. Mr. Bashaw further explained that the "leveling" proposal is a "work in progress" to permit further discussion with experts on the impact of water on a filed. Rusty Van Leuven, Arizona Department of Agriculture, indicated that the existing crop BMPs continue to be used by the agricultural community and are considered economical and feasible.

6) **Action Items**
1. ADEQ will continue to populate the rule comparison table.
2. ADEQ will compare control efficiencies on a high/medium/low of BMPs used in the Maricopa Nonattainment area with California CMPs.
3. Sona Chilingaryan (EPA) will check California county programs within Air Quality Control Districts to determine if there are more stringent measures at the county level.
4. ADEQ and the Department of Agriculture will review the Clean Water Act and other sources for both housed and open operations to determine threshold levels for the number of animals for a given facility.
5. ADEQ will develop a responsiveness summary for comments received on the draft BMPs to date.
6. Schedule additional TWG meeting: **December 18, 2009, at 9:30 a.m., ADEQ Conf. Rm 250**

7) **Adjournment**
Mr. Petznick and Mr. Rogers adjourned the meeting at 3:20 p.m.

For additional information contact Corky Martinkovic, 602-771-2372 or dam@azdeq.gov

Poultry Best Management Practices to Reduce PM_{10} Emissions

The Phoenix metropolitan area has not met the federal Clean Air Act standards for PM_{10} emissions since the Act was revised in 1990. There are different levels of nonattainment based on the extent to which the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards are exceeded. Under current law, any farmer who farms more than ten contiguous acres of land located within the Maricopa County PM_{10} nonattainment area and the portion of Maricopa County in Area A is required to implement PM_{10} regulations. The regulations are incorporated into the EPA-approved Statewide Implementation Plan (SIP). The SIP establishes measures that will be used to reduce emissions and attain acceptable air quality standards in general.

Recently passed legislation (SB 1225) requires the Agricultural Best Management Practices Committee to adopt PM_{10} control rules by June 30, 2010, for animal agriculture that will apply to regulated areas in Maricopa County. Retroactive to June 1, 2009, it also stipulates that rules adopted that regulate animal agriculture and commercial farming in future PM_{10} nonattainment areas be adopted through the Committee BMP process. The Committee consists of fifteen members from various sectors of the agricultural community, including poultry. The members are appointed by the Governor and are responsible for adopting an agricultural general permit. An agricultural general permit outlines Best Management Practices (BMP's) for regulated agricultural activities in order to reduce PM_{10} emissions. PM_{10} emissions refer to particulate matter with an aerodynamic equivalent diameter of less than ten micrometers, and are regulated for public health reasons. The Committee adopts by rule a list of BMP's that can vary according to regional or geographical conditions or management practices. The Committee is required to adopt BMP's for animal agriculture, and requires dairy, beef cattle, poultry and swine operations to follow those BMP's if they are located in an area regulated as a PM_{10} nonattainment area. Currently, the Maricopa PM_{10} particulate nonattainment area and that portion of Area A located in Maricopa County are regulated areas.

An *agricultural general permit* is defined as BMP's that reduce PM_{10} emissions. Included in the definition of an agricultural general permit are BMP's that reduce PM_{10} emissions from the activities of a dairy, beef cattle feedlot, poultry facility, or swine facility, including practices relating to:

a) unpaved access connections.

b) unpaved roads or feed lanes.

c) animal waste handling and transporting.

d) arenas, corrals and pens.

Pursuant to SB 1225 producers are required to select two BMP's from each of the four categories.

The following lists of control measures can be used to control PM_{10} emissions for each of the following categories. Each category lists an emission factor in lb/head/year that can be reduced by the individual BMP's control efficiency factor.

Emissions	**Poultry Operations PM10 Best Management Practices**	Control Efficiency %
2lbs/Vehicle Miles Traveled	**Unpaved Access Connections (any unpaved private road connection with a paved public road)**	
	Install signage that prohibits vehicular speeds in excess of 15 miles per hour.	42
	Install speed control devices (e.g., speed bumps, closed gates).	81
	Restrict access to thru traffic by posting signs or installing gates.	10
	At all exits; install gravel pad, pavement or other track-out control device between all unpaved road connection and paved public road.	10
	Unpaved Roads/Equipment Areas	
	Install signage that prohibits vehicular speeds in excess of 15 mph	42
	Restrict access to thru traffic by posting signs or installing gates	10
	Sprinkle water	70
	Use gravel, rock, or grindings	46
.0213lbs/Hd/Yr	**Animal Feeding, Waste Handling and Transportation**	
	Remove spilled feed from the facility at least once every 14 days	10
	Store feed in an enclosed weatherproof storage structure	10
	Add oil and/or water to the feed rations to minimize PM_{10} during feed handling and consumption	10
	Distribute feed within the houses in an enclosed feed distribution system	10
	Use a flexible discharge spout on the end of the feed truck transfer auger for feed deliveries to the site	10
	Minimize drop distance from feed distribution system into feeders (i.e. extension line off of feed distribution system into feeder)	10
	Enclose transfer point(s) from the feed storage structure to the in-barn feed distribution system	10
	Wash floors and walls between animal groups to remove PM_{10} and manure accumulations	10
	Clean aisles between cage rows at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation	10
	Stack separated solids to minimize surface area exposure	10
	Maintain moisture in solids	10
	Housing	
	Clean/wash fans, louvers, and soffit inlets between animal groups to remove PM_{10} accumulation	10
	No bedding is used in the production facility	10
	Control vegetation on building exteriors to prevent PM_{10} accumulation	10
	Add moisture through coolers in housing on dry hot days	10

Emissions and Control Efficiency figures are based on the Conservation Services Report Program Report for 2005 dated January 19, 2006 to the San Joaquin Valley Air Pollution Control District. Prepared by Patia Siong, Senior Air Quality Specialist and Samir Sheikh, Permit Services Manager. Reviewed by David Warner, Director of Permit Services and Seyed Sadredin, Deputy APCO. Report is found at: http://www.valleyair.org/farmpermits/updates/cmp_program_report_for_2005.pdf

Unpaved Access Connections

An unpaved access connection is defined as any unpaved private road connection with a paved public road. The goal involves minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road.

Unpaved Access Connections(any unpaved private road connection with a paved public road	Control Efficiency
Install signage that prohibits vehicular speeds in excess of 15 miles per hour.	42%
Install speed control devices (e.g., speed bumps, closed gates).	81%
Restrict access to thru traffic by posting signs or installing gates.	10%
At all exits; install gravel pad, pavement or other track-out control device between all unpaved road connection and paved public road.	10%

The practice of installing speed limit signs, speed bumps, or maintaining the road in such a manner that inhibits vehicular speed in excess of 15 miles per hour reduces PM_{10} from getting on to the paved public road from unpaved access connections. PM_{10} becomes entrained when vehicles pass over the unpaved road or area surface and can also be suspended by natural winds. PM_{10} emissions are a function of speed, meaning reducing speed reduces PM_{10} emissions. There is a linear relationship between speed and emissions; therefore, reducing speed to 15 mph will result in proportional emission reductions.

Restricting access means to limit public access to private roads and areas. That can be achieved by installing a line with a no-trespassing sign, by placing any other type of physical restriction across the road to discourage the use of it, or by signage that limits public access and thru traffic. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, restricting access will discourage the unnecessary use of the unpaved road and reduces emissions. With this concept, it is reasonable to assume that none to very minimal PM_{10} emissions would result from the mechanical disturbance of soil by the tires and vehicle on those unpaved roads and areas during non-agricultural activity.

Track-out control measures installed between the paved roads and unpaved vehicle/equipment traffic areas assist in reducing PM_{10} when vehicle pass over the unpaved road or area surface and onto traffic areas. This can be accomplished by maintaining sufficient length of paved/graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of other methods to dislodge debris from tires and undercarriage of vehicles leaving site.

Unpaved Roads/Equipment Areas

When a vehicle travels on an unpaved surface, such as an unpaved road or unpaved equipment area, the force of the wheels on the road surface causes pulverization of surface material. PM_{10} are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the

vehicle has passed. The quantity of PM_{10} emissions from a given segment of unpaved road varies linearly with the volume of traffic. Field investigations also have shown that emissions depend on source parameters that characterize the condition of a particular road and the associated vehicle traffic.

Control measures for unpaved roads and equipment areas include application of chemical dust suppressants, paving the surface or placing a layer of gravel over the unpaved surface, speed reduction, access restriction, and utilizing appropriate vehicles.

Unpaved Roads/Equipment Areas	**Control Efficiency**
Install signage that prohibits vehicular speeds in excess of 15 miles per hour.	42%
Restrict access to thru traffic by posting signs or install gates.	10%
Sprinkle water	70%
Use gravel, rock, or grindings	46%

The practice of installing speed limit signs in such a manner that inhibits vehicular speed in excess of 15 miles per hour reduces PM_{10} emissions. PM_{10} emissions become entrained when vehicles pass over the unpaved road or area surface and can also be suspended by natural winds. PM_{10} emissions are a function of speed, meaning reducing speed reduces PM_{10} emissions. There is a linear relationship between speed and emissions; therefore, reducing speed to 15 mph will result in proportional emission reductions.

Restricting access means limiting public access to private roads and equipment areas. That can be achieved by installing a line with a no-trespassing sign, by placing any other type of physical restriction across the road to discourage the use of it, or by signage that limits public access and thru traffic. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, restricting access will discourage the unnecessary use of the unpaved road and reduces emissions. With this concept, it is reasonable to assume that none to very minimal PM_{10} emissions would result from the mechanical disturbance of soil by the tires and vehicle on those unpaved roads and areas during non-agricultural activity.

Water can be used as a control measure on unpaved roads and unpaved equipment areas to reduce PM_{10} emissions. The emissions on these roads and areas result from the mechanical disturbance of soil by the tires and vehicle. Water increases soil particle mass by binding to them and also adds surface tension forces. Even after water evaporation, the properties of the cohesion of water and particles remains due to the formation of aggregates and surface crusts.

Gravel or other aggregate material can be used as a control measure on unpaved roads and unpaved equipment areas to reduce PM_{10} emissions when vehicles pass over the unpaved road or area surface. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, they can be reduced by changing the surface of the road. Gravel provides a protection similar to a chemical stabilization. It adds a layer that separates the soil surface from the tires and reduces the amount of PM_{10} emissions being suspended in the air. A layer of gravel must be placed at an appropriate depth to minimize emissions.

Animal Feeding, Waste Handling and Transporting

PM_{10} emissions in animal feeding operations originate from feed, bedding material, and manure, and can depend on several factors. Emissions result from the disturbance of dry and loose surface materials caused by animal movement and mechanical disturbances by vehicles.

Animal Feeding, Waste Handling and Transporting	Control Efficiency
Remove spilled feed from the facility at least once every 14 days	10%
Store feed in an enclosed weatherproof storage structure	10%
Add oil and/or water to the feed rations to minimize PM_{10} during feed handling and consumption	10%
Distribute feed within the houses in an enclosed feed distribution system	10%
Use a flexible discharge spout on the end of the feed truck transfer auger for feed deliveries to the site	10%
Minimize drop distance from feed distribution system into feeders (i.e. extension line off of feed distribution system into feeder)	10%
Enclose transfer point(s) from the feed storage structure to the in-barn feed distribution system	10%
Wash floors and walls between animal groups to remove PM_{10} and manure accumulations	10%
Clean aisles between cage rows at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation	10%
Stack separated solids to minimize surface area exposure	10%
Maintain moisture in solids	10%

Feeding operations include the procurement and storage of large quantities of different feed ingredients. These various ration components are mixed together then transported to the animal housing and dispensed to the animals multiple times a day. The PM_{10} emissions from feed storage areas due to wind erosion can be reduced by the use of bunkers, coverings, bins, tanks, and commodity barns. High moisture feeds and the addition of water, oils and molasses to feed rations reduce PM_{10} emissions by binding these small particles to the larger ones in the ration.

Housing

The control of PM_{10} emissions in areas where animals are housed can be broken down into different mitigation strategies. Physical design characteristics of houses can have a significant impact on reducing PM_{10} emissions. Another area where PM_{10} emissions can be minimized is management procedures that not only optimize operations for efficient production but also take into account each procedures impact on PM_{10} emission reductions.

Housing	Control Efficiency
Clean/wash fans, louvers, and soffit inlets between animal groups to remove PM_{10} accumulation	10
No bedding is used in the production facility	10
Control vegetation on building exteriors to prevent PM_{10} accumulation	10
Add moisture through coolers in housing on dry hot days	10

Cleaning and washing fans, louvers, and soffit inlets removes accumulated PM_{10} from air intake and outflow locations. Bedding captures PM_{10} inside the housing facility and is lifted into the air by the animals or during removal. Vegetation located next to a building can accumulate $PM_{10.}$ Adding moisture to the housing on dry hot days can keep moisture levels in the house at higher levels and suppress the movement of $PM_{10.}$

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Swine Best Management Practices to Reduce PM_{10} Emissions

The Phoenix metropolitan area has not met the federal Clean Air Act standards for PM_{10} emissions since the Act was revised in 1990. There are different levels of nonattainment based on the extent to which the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards are exceeded. Under current law, any farmer who farms more than ten contiguous acres of land located within the Maricopa County PM_{10} nonattainment area and the portion of Maricopa County in Area A is required to implement PM_{10} regulations. The regulations are incorporated into the EPA-approved Statewide Implementation Plan (SIP). The SIP establishes measures that will be used to reduce emissions and attain acceptable air quality standards in general.

Recently passed legislation (SB 1225) requires the Agricultural Best Management Practices Committee to adopt PM_{10} control rules by June 30, 2010, for animal agriculture that will apply to regulated areas in Maricopa County. Retroactive to June 1, 2009, it also stipulates that rules adopted that regulate animal agriculture and commercial farming in future PM_{10} nonattainment areas be adopted through the Committee BMP process. The Committee consists of fifteen members from various sectors of the agricultural community, including swine. The members are appointed by the Governor and are responsible for adopting an agricultural general permit. An agricultural general permit outlines Best Management Practices (BMPs) for regulated agricultural activities in order to reduce PM_{10} emissions. PM_{10} emissions refer to particulate matter with an aerodynamic equivalent diameter of less than ten micrometers, and are regulated for public health reasons. The Committee adopts by rule a list of BMPs that can vary according to regional or geographical conditions or management practices. The Committee is required to adopt BMPs for animal agriculture, and requires dairy, beef cattle, poultry and swine operations to follow those BMPs if they are located in an area regulated as a PM_{10} nonattainment area. Currently, the Maricopa PM_{10} particulate nonattainment area and that portion of Area A located in Maricopa County are regulated areas.

An *agricultural general permit* is defined as BMPs that reduce PM_{10}emissions. Included in the definition of an agricultural general permit are BMP's that reduce PM_{10} emissions from the activities of a dairy, beef cattle feedlot, poultry facility, or swine facility, including practices relating to:

a) unpaved access connections.

b) unpaved roads or feed lanes.

c) animal waste handling and transporting.

d) arenas, corrals and pens.

Pursuant to SB 1225 producers are required to select two BMP's from each of the four categories.

The following lists of control measures can be used to control PM_{10} emissions for each of the following categories.

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Emissions	**Swine Operation PM10 Best Management Practices**	Control Efficiency Percentage
2lbs/Vehicle Miles Traveled	**Unpaved Access Connections (any unpaved private road connection with a paved public road)**	
	Install signage that prohibits vehicular speeds in excess of 25 miles per hour.	3
	Install speed control devices (e.g., speed bumps).	81
	Restrict access to thru traffic by posting signs or installing gates.	10
	At all exits; install gravel pad, pavement or other track-out control device between all unpaved road connection and paved public road.	10
	Unpaved Roads/Equipment Areas	
	Install signage that prohibits vehicular speeds in excess of 25 mph	3
	Install speed control devices (e.g. speed bumps)	3
	Restrict access to thru traffic by posting signs or installing gates	10
	Maintain roads in such a manner that inhibits vehicular speeds in excess of 25 mph	3
	Apply dust suppressant(s) on roads (polymers, road oil, water)	80,76,70
	Install wind barriers along road side	30
	Use gravel, rock, or grindings	46
#/Hd/Yr	**Animal Feeding, Waste Handling and Transportation**	
	Remove spilled feed from the facility at least once every 14 days	10
	Store grain in an enclosed weatherproof storage structure	10
	Add oil and/or water to the feed rations to minimize dust during feed handling and consumption	10
	Distribute feed within the barns in an enclosed feed distribution system	10
	Use a flexible discharge spout on the end of the feed truck transfer auger for feed deliveries to the site	10
	Minimize drop distance from feed distribution system into feeders (i.e. extension line off of feed distribution system into feeder)	10
	Enclose transfer point(s) from the feed storage structure to the in-barn feed distribution system	10
	Wash pens, floors, and walls between animal groups to prevent dust and manure accumulations	10
	Clean aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation	10
	Store separated solids in a wind-blocked area	10
	Stack separated solids to minimize surface area exposure	10
	Maintain moisture in solids	10
	Maintain liquid lagoon level above solids accumulation in lagoons	10
	Housing	
	Clean/wash fans and louvers between animal groups to remove dust accumulation	10
	No bedding is used in the production facility	10
	Use a slatted floor system to prevent solids build-up	10
	Control vegetation on building exteriors to prevent dust accumulation	10
	Add moisture through coolers in-barn on dry hot days	10

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Emissions and Control Efficiency figures are based on the Conservation Services Report Program Report for 2005 dated January 19, 2006 to the San Joaquin Valley Air Pollution Control District. Prepared by Patia Siong, Senior Air Quality Specialist and Samir Sheikh, Permit Services Manager. Reviewed by David Warner, Director of Permit Services and Seyed Sadredin, Deputy APCO. Report is found at: http://www.valleyair.org/farmpermits/updates/cmp_program_report_for_2005.pdf

Where Control efficiency figures are unknown, a level of 10 is assumed per XXXX. Accurate Emissions in swine animal feeding, waste handling, transportation, and housing categories are unknown at this time due to lack of data. This document will need to be reevaluated when additional emissions and control efficiency data is available for swine.

Unpaved Access Connections

An unpaved access connection is defined as any unpaved private road connection with a paved public road. The goal involves minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved roads and falls onto a paved public road or the paved shoulder of a paved public road.

Unpaved Access Connections (any unpaved private road connection with a paved public road).	**Control Efficiency**
Install signage that prohibits vehicular speeds in excess of 25 miles per hour.	3
Install speed control devices (e.g., speed bumps).	81
Restrict access to thru traffic by posting signs or installing gates.	10
At all exits; install gravel pad, pavement or other track-out control device between all unpaved road connection and paved public road.	10

The practice of installing speed limit signs, speed bumps, or maintaining the road in such a manner that inhibits vehicular speed in excess of 25 miles per hour reduces PM_{10} from getting on to the paved public road from unpaved access connections. Access gates will also limit speed due to the physical act of stopping to open and close the gate. PM_{10} becomes entrained when vehicles pass over the unpaved road or area surface and can also be suspended by natural winds. PM_{10} emissions are a function of speed, meaning reducing speed reduces PM_{10} emissions. There is a linear relationship between speed and emissions; therefore, reducing speed to 25 mph will result in proportional emission reductions.

Restricting access means to limit public access to private roads and areas. That can be achieved by installing a line with a no-trespassing sign, by placing any other type of physical restriction across the road to discourage the use of it, or by signage that limits public access and thru traffic. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, restricting access will discourage the unnecessary use of the unpaved road and reduces emissions. With this concept, it is reasonable to assume that none to very minimal PM_{10} emissions would result from the mechanical disturbance of soil by the tires and vehicle on those unpaved roads and areas during non-agricultural activity.

Track-out control measures installed between the paved roads and unpaved vehicle/equipment traffic areas assist in reducing PM_{10} when vehicle pass over the unpaved road or area surface and onto traffic

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areas. This can be accomplished by maintaining sufficient length of paved/graveled interior roads to allow mud and dirt to drop off vehicles before exiting the site; or use of other methods to dislodge debris from tires and undercarriage of vehicles leaving site.

Unpaved Roads or Feed Lanes

When a vehicle travels on an unpaved surface, such as an unpaved road or unpaved equipment area, the force of the wheels on the road surface causes pulverization of surface material. PM_{10} are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. The quantity of PM_{10} emissions from a given segment of unpaved road varies linearly with the volume of traffic. Field investigations also have shown that emissions depend on source parameters that characterize the condition of a particular road and the associated vehicle traffic.

Control measures for unpaved roads and equipment areas include application of chemical dust suppressants, paving the surface or placing a layer of gravel over the unpaved surface, speed reduction, access restriction, and utilizing appropriate vehicles.

Unpaved Roads or Feed Lanes	Control Efficiency
Unpaved Roads/Equipment Areas	
Install signage that prohibits vehicular speeds in excess of 25 mph	3
Install speed control devices (e.g. speed bumps)	3
Restrict access to thru traffic by posting signs or installing gates	10
Maintain roads in such a manner that inhibits vehicular speeds in excess of 25 mph	3
Apply dust suppressant(s) on roads (polymers, road oil, water)	80,76,70
Use gravel, rock, or grindings	46

The practice of installing speed limit signs in such a manner that inhibits vehicular speed in excess of 25 miles per hour reduces PM_{10} emissions. Access gates will also limit speed due to the physical act of stopping to open and close the gate. PM_{10} emissions become entrained when vehicles pass over the unpaved road or area surface and can also be suspended by natural winds. PM_{10} emissions are a function of speed, meaning reducing speed reduces PM_{10} emissions. There is a linear relationship between speed and emissions; therefore, reducing speed to 25 mph will result in proportional emission reductions.

Restricting access means limiting public access to private roads and equipment areas. That can be achieved by installing a line with a no-trespassing sign, by placing any other type of physical restriction across the road to discourage the use of it, or by signage that limits public access and thru traffic. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, restricting access will discourage the unnecessary use of the unpaved road and reduces emissions. With this concept, it is reasonable to assume that none to very minimal PM_{10} emissions would result from the mechanical disturbance of soil by the tires and vehicle on those unpaved roads and areas during non-agricultural activity.

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Water can be used as a control measure on unpaved roads and unpaved equipment areas to reduce PM_{10} emissions. The emissions on these roads and areas result from the mechanical disturbance of soil by the tires and vehicle. Water increases soil particle mass by binding to them and also adds surface tension forces. Even after water evaporation, the properties of the cohesion of water and particles remains due to the formation of aggregates and surface crusts.

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Gravel or other aggregate material can be used as a control measure on unpaved roads and unpaved equipment areas to reduce PM_{10} emissions when vehicle pass over the unpaved road or area surface. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, they can be reduced by changing the surface of the road. Gravel provides a protection similar to a chemical stabilization. It adds a layer that separates the soil surface from the tires and reduces the amount of PM_{10} emissions being suspended in the air. A layer of gravel must be placed at an appropriate depth to minimize emissions.

Applying nontoxic chemical or organic PM_{10} suppressants as a control measure on unpaved roads and unpaved vehicle/equipment traffic areas reduces PM_{10} emissions when vehicle pass over the unpaved road or area surface. These control measures must not be prohibited for use by any applicable regulation and also must meet any specification required by any federal, state, or local water agency. Because PM_{10} emissions result from the mechanical disturbance of soil by the tires and vehicle, they can be reduced by changing the surface of the road either with wet suppression or chemical stabilization. Wet suppression keeps the road surface wet to control emissions. Chemical stabilization tries to change the physical characteristics of the surface. For example, road oil forms a coat over PM_{10} forming a hard crust and also improves the cohesive resistance of road material. It usually can be applied once every two to three months and re-applied several times per year to maintain its efficiency. Other types of dust suppressant have high water content to dilution ratios that allows the water to evaporate once applied to the soil and the non-water solution bonds the fine soil particles making them into larger particles; thus making those particles less susceptible to being entrained. Others draw moisture from the environment that acts to keep road surfaces moist, thus holding PM_{10} emissions down. Several studies were performed to evaluate the control effectiveness of PM_{10} suppressants. Two of them were performed in the San Joaquin Valley; one in Fresno County by UC Davis, and the other in Merced County by the Desert Research Institute. These two studies provide the best available data to date. Here's an explanation of the PM_{10} suppressant properties as described by the Desert Research Institute:

- **Salts:** these are hygroscopic compounds such as magnesium chloride or calcium chloride. They absorb water when the relative humidity exceeds about 50%. Water improves the adherence of the soil particles to each other. Salts are often depleted by precipitation and runoff owing to their high solubility.
- **Resin or petroleum emulsion:** these are non-water-soluble organic compounds that are emulsified or suspended in water. When these emulsions are sprayed onto soil, they stick the soil particles together, and eventually harden to form a solid mass. There are several emulsion products based on tree resin, petroleum, or asphalt compounds.
- **Polymers:** these act as adhesives which may be more effective than ordinary resins because their molecular structure is a long chain which in theory may be able to stick to more particles, or bridge larger particle-to-particle gaps.

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- **Surfactants**: these reduce water surface tension, allowing available moisture to more effectively wet the particles and aggregates in the surface layer.
- **Bitumens:** these include materials such as asphalt or road oil that effectively pave the surface.
- **Adhesives:** these include lignin sulfonate, a syrupy wood product which creates a sticky but water-soluble layer.
- **Solid materials:** these include a petroleum industry by-product made by mixing recycled materials with earth materials.

Animal Feeding, Waste Handling and Transporting

The daily activities of feeding animals and removing manure require the handling and transportation of large amounts of bulk materials. These activities contribute to PM_{10}. A number of procedures have been identified to reduce these emissions when storing and handling bulk materials.

PM_{10} emissions in animal feeding operations originate from feed, bedding material, and manure, and can depend on several factors such as stocking density, and feeding methods. Emissions result from the disturbance of dry and loose surface caused by animal movement and mechanical disturbances by the tires and vehicle.

Animal Feeding, Waste Handling and Transporting	Control Efficiency
Remove spilled feed from the facility at least once every 14 days	10
Store grain in an enclosed weatherproof storage structure	10
Add oil and/or water to the feed rations to minimize dust during feed handling and consumption	10
Distribute feed within the barns in an enclosed feed distribution system	10
Use a flexible discharge spout on the end of the feed truck transfer auger for feed deliveries to the site	10
Minimize drop distance from feed distribution system into feeders (i.e. extension line off of feed distribution system into feeder)	10
Enclose transfer point(s) from the feed storage structure to the in-barn feed distribution system	10
Wash pens, floors, and walls between animal groups to prevent dust and manure accumulations	10
Clean aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation	10
Store separated solids in a wind-blocked area	10
Stack separated solids to minimize surface area exposure	10
Maintain moisture in solids	10
Maintain liquid lagoon level above solids accumulation in lagoons	10

Swine feed is delivered to the housing unit site premixed. No raw material storage or feed mixing occurs on-site. Swine feed is bulk stored outside of the swine housing units. Bulk feed deliveries occur

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on an as-needed basis. From the bulk feed storage area, feed is transferred into the housing units as necessary. Once inside of the housing units, the feed is distributed into feeders within each of the pens.

Fugitive particulate matter (PM_{10}) emissions in animal feeding operations can originate from feed and feed transfer. Emissions due to wind can be reduced by minimizing wind contact through use of a flexible discharge spout on the end of the feed truck transfer auger for bulk feed deliveries to the housing units and storing bulk feed inside of weatherproof storage structures. Addition of water and/or oils to feed rations can reduce PM_{10} emissions by binding the small particles to the larger ones in the ration. Emissions can be further reduced through enclosing transfer point(s) from the bulk feed storage structure to the in-barn feed distribution system, distribution of feed within the barns in an enclosed feed distribution system, and minimizing drop distance from the feed distribution system into feeders. All of these practices will reduce emissions by reducing introduction of PM_{10} into the air during feed disturbance by minimizing air contact during feed conveyance. Removing spilled feed from the facility at least once every 14 days will minimize the PM_{10} emissions from air movement across feed spills.

When disturbed by animals or employees, dried manure, dust, and spilled feed can contribute to PM_{10} emissions. Washing pens, floors, and walls between animal groups will prevent dust and manure accumulation. Cleaning aisles between pens and stalls at least twice every 14 days will prevent dried manure, spilled feed, and debris accumulation.

Solids in the swine effluent can be mechanically separated for better nutrient management. Fugitive PM_{10} emissions can originate from the solids and manure stacks. PM_{10} emission can be reduced by stacking separated solids to minimize surface area exposure, minimizing wind exposure. Maintaining moisture in the solids can also reduce PM_{10} emissions by binding the small particles to the larger particles. Maintaining the liquid lagoon level above the solids accumulation in the lagoons will reduce PM_{10} emissions by preventing wind exposure.

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Housing

The control of PM_{10} emissions in areas where animals are housed can be broken down into a number of different mitigation strategies. Physical design characteristics of facilities can have a significant impact on reducing PM_{10} emissions. Another area where PM_{10} emissions can be minimized are management procedures that not only optimize operations for efficient production but also take into account each procedures impact on PM_{10} emission reductions.

Housing	Control Efficiency
Clean/wash fans and louvers between animal groups to remove dust accumulation	10
No bedding is used in the production facility	10
Use a slatted floor system to prevent solids build-up	10
Control vegetation on building exteriors to prevent dust accumulation	10
Add moisture through coolers in-barn on dry hot days	10

Swine are produced inside of temperature regulated housing units with mechanical ventilation for pig comfort. The disturbance of housing unit surfaces, by air movement and animal/employee movement, is a source of PM_{10} emissions. PM_{10} emissions can be reduced through dust mitigation inside and around the housing units.

Mechanical ventilation fans accumulate dust on the fan blades and louvers as they operate; cleaning/washing fan blades and louvers between animal groups reduces PM_{10} that can break free into the air from the fans and louvers. Vegetation around the housing units can increase PM_{10} emissions by trapping dust then dispensing into the atmosphere as air moves across it. Controlling vegetation on building exteriors will prevent dust accumulation.

The disturbance of dried solids build-up results in PM_{10} emissions. Slatted or perforated flooring allows effluent from the animals to fall into liquid pits below the floor, minimizing solids build-up within the enclosure. The use of bedding results in PM_{10} emissions due to the disturbance and break down of bedding material as well as disturbance of solids accumulation within the bedding material. PM_{10} emissions from bedding material and solids accumulation are prevented by not using bedding material.

The addition of moisture through in-barn coolers on hot days reduces PM_{10} emissions by increasing the moisture level in the air and on surfaces, reducing PM_{10}emissions caused by air movement and animal/employee disturbance. Addition of moisture will also help prevent any solids accumulation from drying out and becoming airborne as PM_{10} during disturbance.

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DRAFT Proposed new Crop BMP's

Add the following BMP's to Category I: Tillage and Harvest

1) **Transplanting** – utilizing plants already in a growth state. The benefit is to reduce soil disturbance and number of passes compared to seeding. An example is instead of direct seeding, use transplants to avoid tillage. Viable mostly for vegetable crops.

   According to the San Joaquin & Imperial County information, transplanting has a 12% control efficiency in onions and garlic and a 6% control efficiency in vegetables, tomatoes, melon and other.

   The land preparation emission factor (pounds of PM10/acre/year) would be:
   Onions & garlic 6.5
   Vegetables, tomatoes, melons & other 9.05

2) **Shuttle system/larger carrier** – using a multiple bin/trailer. The benefit is to haul multiple or larger trailers bins per trip thereby reducing emission through reduced passes. An example is a boll buggy, cotton module versus trailers, gondolas and bulk movement of commodity from field.

   According to the San Joaquin & Imperial County information, shuttle systems/larger carriers has a 40% control efficiency for cotton; 20% control efficiency for dry beans, cereal grains, safflower, wheat and barley; 17% control efficiency in alfalfa, citrus and tree fruit, corn, grain and silage, sugar beets, vegetables tomatoes, melons and other; 16% control efficiency in grapes; and 10% in nut crops.

   The harvest emission factor (pounds of PM10/acre/year) would be:
   Citrus 0.14
   Corn grain & silage 0.43
   Cotton 3.37
   Dry beans, cereal grains, safflower, wheat & barley 3.45
   Grapes 0.17
   Nut crops 36.5
   Onions & garlic 1.68
   Tree fruit 0.14
   Sugar beets 1.69
   Vegetables, tomatoes, melons & other 0.23

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Significant Crop Land Leveling Activities:

Introduce a new BMP category under R18-2-611 titled "Significant Crop Land Leveling Activities". Significant Crop Land Leveling Activities are defined as crop land leveling activities that disturb the soil more than 4 inches below the surface. When a commercial farmer is conducting these activities, he/she will need to implement two BMP's from this new category. Proposed BMP's for this category are as follows:

1. Apply water prior to conducting significant crop land leveling activities and/or time significant crop land leveling activities to coincide with precipitation.
    a. Application of water through irrigation or delaying significant crop land leveling activities to coincide with precipitation or any other means of water application in enough quantity to reduce PM10 emissions from the commercial farm site prior to conducting significant crop land leveling activities.

2. Apply water during significant crop land leveling activities.
    a. Application of water through water trucks or sprinkler systems or any other means that would reduce the amount of PM10 emissions from the commercial farm site while significant crop land leveling activities are being conducted.

3. Limit significant crop land leveling activities during high wind events.
    a. Limiting significant crop land leveling activities when the measured wind speed at 6 ft in height is more than 25mph at the commercial farm site.

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Maricopa County
Air Quality Department

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November 23, 2009

Ms. Lisa Tomczak
Environmental Program Specialist
Air Quality Division, Planning Unit
Arizona Department of Environmental Quality

Dear Ms. Tomczak,

Thank you for the opportunity to review the "Arizona Beef Feedlot Best Management Practices Proposal". Maricopa County's comments on the draft document are listed below.

General Comments:

1. Please provide references (with page numbers) for the emission factors and control efficiencies shown in the document.

2. Please add a column to the table noting the source of the best management practices (BMP) (e.g. San Joaquin Valley Air Pollution Control District (SJVAPCD), South Coast Air Pollution Control District, Imperial County, etc.). If the BMP is new and not in place in another area, please note this.

3. Maricopa County Rule 310.01 (Fugitive Dust from Non-Traditional Sources of Fugitive Dust), Section 302.8 (Livestock Activities) contains the following visible emission requirements. Equivalent requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.
   – 20% opacity limit for unpaved access connections, unpaved feed lane access areas, corrals, pens, and arenas (Section 302.8(a)(1) and (2)), and
   – Limit on visible emissions beyond the property line (Section 302.8(a)(3)).

4. What is the basis of the "animal feeding" BMPs (Feed High Moisture Feeds, Feed Higher Moisture Feed to Increase Moisture in Pens, and Add Molasses or Tallow to Feed)? These are not contained in the SJVAPCD Conservation Management Practices (CMP) program nor are they contained in Imperial County's Beef Feedlot Mitigation Measures. What is the basis for the 10% control efficiency? Do these measures reduce PM_{10}, NH_3, or VOC? If these are NH_3 or VOC measures, how effective are they in reducing PM_{10} in Arizona which is dominated by coarse fraction PM_{10}. These BMPs should be removed from the list unless data supporting their effectiveness at controlling or reducing PM_{10} emissions can be provided.

Comments on Arena, Corral and Pen BMPs

5. What is the basis of the "Concrete Apron (at least 8 ft) in Pen Approaching Feed Bunks" and the "Concrete Aprons (at least 4 ft) in Pen Approaching Water Troughs" BMPs? These are not contained in the SJVAPCD CMP program nor are they contained in Imperial County's Beef Feedlot Mitigation Measures. Similar measures are listed in SJVAPCD's "Dairy Potential BACT Requirements and Mitigation Measures" (see "Pave feedlane at least 8 feet on the corral side of the fence"); however, these measures are listed as VOC and NH_3 measures. Do these measures reduce coarse fraction PM_{10}? These BMPs should be removed from the list unless data supporting their effectiveness at controlling or reducing PM_{10} emissions can be provided.

6. The following BMPs relate to increasing stocking density and should be combined into one BMP: "Increase stocking density in corrals to increase manure moisture". Additionally, this BMP needs to specify either the percent shade coverage required or the targeted stocking density and a targeted moisture control of 20%. Dr. Auvermann mentioned that there are shade and stocking density specifications that need to be met for effective control.
   –Provide shade in corrals to increase stocking density and suppress animal movement
   –Increase stocking density in corral to increase manure moisture

7. In regard to the "Add moisture to pen surface via water sprinkling (3 to 6 gallons per head/per day – selective of moisture and weather conditions)" BMP. First, this BMP should be revised to "Sprinkle or Sprinkling of Open Corral" similar to SJVAPCD's CMP. Second, this BMP needs to specify a target moisture control of 20% and a target watering to a depth of 1/10 to 1/4 inch per day (in accordance with Dr. Auvermann's recommendations) or an "overall moisture factor between 20% and 40%, in the top three inches" similar to Imperial County Air Pollution Control District's Rule 420 rather than a "gallons per head/ per day" target. Lastly, what is the basis for the 85% control efficiency for this measure? Dr. Auvermann's presentation showed a 30-55% reduction and SJVAPCD assumed a minimal 10% control effectiveness[1].

8. In regard to the "Frequent manure removal (every 6 months) leaving an even corral surface of compacted manure on top soil" BMP, the frequency of manure removal does not meet optimum frequency based on Dr. Auvermann's recommendation of between 3 and 6 times per year. In addition to specifying the optimum scraping and manure removal frequency, the ideal depth needs to be specified as well. SJVAPCD's description of "Frequent Scraping and/or Manure Removal" states "Keeping the dusty manure depth less than one inch above the ground, and therefore keeping the corral surface thin and well compacted reduces PM emissions."

9. What is the basis for the "Pile manure between cleaning" BMP? This is not contained in the SJVAPCD CMP program nor is it contained in Imperial County's Beef Feedlot Mitigation Measures. This BMP should be removed from the list unless data supporting its effectiveness at controlling or reducing PM_{10} emissions can be provided.

10. What is the basis of the "Feed higher moisture feed (Wet Distiller Grain Solubles) to increase moisture in pens" BMP? These are not contained in the SJVAPCD CMP program nor are they contained in Imperial County's Beef Feedlot Mitigation Measures. What is the source of the 10% control efficiency? This BMP should be removed from the list unless data supporting its effectiveness at controlling or reducing PM_{10} emissions can be provided.

11. In regard to the "Control cattle during movements (So they do not run)" BMP, Dr. Auvermann stated in his presentation that "animal behavior changes" are hard to implement and not always effective. Because this BMP is not contained in any other EPA approved CMP program (i.e. San Joaquin Valley or Imperial County Air Pollution Control Districts) and Dr. Auvermann stated this type of control is not always effective, this BMP should be removed from the list.

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[1] San Joaquin Valley Air Pollution Control District, Conservation Management Practices Program Report for 2005, January 19, 2006, p. 5 AFO DF 11/05.

12. In regard to the "Plant tree windbreak" BMP, this needs to specify "install within 50 feet to 100 feet of corrals, pens, and arenas" similar to Maricopa County Rule 310.01 Section 302.8(b)(3)(b).

13. The livestock provisions contained in Maricopa County Rule 310.01, Section 302.8 include a 20% opacity limit for "corrals, pens, and arenas" (Section 302.8(a)(2)) and a limit on visible emissions beyond the property line (Section 302.8(a)(3)). Similar requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.

14. MCAQD Rule 310.01, Section 302.8(b)(3) allows "Apply a fibrous layer (i.e., wood chips) in working areas" as a control measure for "corrals, pens, and arenas" and SJVAPCD allows this CMP for "manure handling". Why is this control measure not a BMP option for beef feedlots?

Comments on Animal Waste, Handling and Transporting BMPs

15. What is the basis of the "animal feeding" BMPs (Feed high moisture feeds, and Add molasses or tallow to feed)? These are not contained in the SJVAPCD CMP program nor are they contained in Imperial County's Beef Feedlot Mitigation Measures. What is the basis of the 10% control efficiency? Do these reduce PM_{10}, NH_3, or VOC? If these are NH_3 or VOC measures, how effective are they in reducing coarse fraction PM_{10}. These BMPs should be removed from the list unless data supporting their effectiveness at controlling or reducing PM_{10} emissions can be provided.

16. MCAQD Rule 310.01, Section 302.8(b)(2)requires <u>all</u> four of the control measures listed below to be implemented for "bulk material hauling, including animal waste, off-site and crossing and/or accessing an area accessible to the public":
    –Load all vehicles used to haul bulk material, including animal waste, such that the freeboard is not less than three inches:
    – Prevent spillage or loss of bulk material, including animal waste, from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s);
    – Cover cargo compartment with a tarp or other suitable closure; and
    – Install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site.

    In order to prevent SIP relaxation and backsliding, the "Cover manure hauling trucks (prior to leaving yard) BMP will need to be revised to include all four control measures noted above.

17. Revise the BMP "Do not load manure when wind exceeds 25 mph" to a lower wind speed, perhaps 10 mph. Also, this BMP may be an available option, however, the four material hauling control measures contained in Rule 310.01, Section 302.8(b)(2) and noted above in comment #16 would need to also be implemented in order to prevent SIP relaxation and backsliding.

Comments on Unpaved Road or Feed Lane BMPs

18. The three BMPs for reducing speed (Install engine speed governors on feed trucks, Install speed limit signs prohibiting vehicle speeds in excess of 15 mph, and Install speed control devices) and the restrict access BMP (Restrict through traffic [Gates/Signs]) need to be combined into one BMP similar to the control option available in proposed Maricopa County Rule 310.01, Section 302.8(b)(1)(d) to prevent SIP relaxation and backsliding:

Maricopa County Rule 310.01, Section 302.8(b)(1)(d):
"Limit vehicle trips to no more than 20 per day per road, limit vehicle speeds to no more than 15 miles per hour, and restrict public access to private roads by installing barriers, curbs, fences, gates, posts, or signs written in compliance with ordinance(s) of local, county, State, or Federal sign standards."

Additionally, as currently written these BMPs only specify the requirement to "install" signage, speed control devices, and access restrictions. Any BMP with a requirement to "install" needs to also specify the requirement to "maintain" the signage, speed control device, and access restriction.

19. Proposed Maricopa County Rule 310.01, Section 302.8 (b)(1)(a) requires "apply water **AND** install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site". Consequently, to prevent SIP relaxation and backsliding the "Sprinkle water on roads/feed lane" BMP needs to be revised to "Apply water and install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site".

20. In regard to the "Oil Roads" BMP, applying oil to roads may have a water quality impact; therefore, this BMP needs to specify the types of oil that are allowed and also specify that "used oil" is not allowed.

21. In regard to the "Gravel, rock, or grindings on road" BMP, the BMP should be revised as follows: "Apply and maintain gravel (maintained to a depth of four inches), rock, or grindings" similar to Maricopa County Rule 310.01, Section 302.8(b)(1)(b): "Apply and maintain pavement, gravel (maintained to a depth of four inches), or asphaltic roadbase".

    Also, why isn't "asphaltic roadbase" listed as an option in this BMP as it is in Maricopa County Rule 310.01 and in South Coast Air Pollution Control District Rule 1186?

22. The BMP "Apply dust suppressants" should be revised to "Apply and maintain dust suppressants other than water" similar to the option available in proposed Maricopa County Rule 310.01, Section 302.8(b)(1)(c).

Comments on Unpaved Access Connection BMPs

23. The following three BMPs are actually "Unpaved road" BMPs and used alone are not sufficient to reduce or control PM_{10} emissions from "Unpaved access connections" (e.g. trackout):
    – Install speed limit signs prohibiting vehicle speeds in excess of 15 mph;
    – Install speed control devices (speed bumps);
    – Restrict through traffic (gates/signs)

    These BMPs should either be removed from this category or combined into one BMP similar to the control option available in proposed Maricopa County Rule 310.01, Section 302.8(b)(1)(d): "Limit vehicle trips to no more than 20 per day per road, limit vehicle speeds to no more than 15 miles per hour, and restrict public access to private roads by installing barriers, curbs, fences, gates, posts, or signs written in compliance with ordinance(s) of local, county, State, or Federal sign standards."

24. The following two controls options currently proposed in Maricopa County Rule 310.01, Section 302.8(b)(1) for unpaved access connections should be added to the list of BMPs for "unpaved access connection":
    – Apply and maintain pavement, gravel (maintained to a depth of four inches), or asphaltic roadbase.
    – Apply and maintain dust suppressants other than water.

25. In regard to the BMP "At all exits: install gravel base, Grizzly, wheel wash system, pavement or other track-out control device between all unpaved road connection and paved public road", the word "other" should be removed or the BMP should be revised to specify that the track-out control device must be "a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site".

26. The livestock activity provisions contained in Maricopa County Rule 310.01, Section 302.8 include a 20% opacity limit for "unpaved access connections" (Section 302.8(a)(1)) and a limit on visible emissions beyond the property line (Section 302.8(a)(3)). Similar requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.

27. Maricopa County Rule 310.01 Section 302.8(c)(3)requires "If trackout occurs, the owner and/or operator shall repair and/or replace the control measure(s) and shall clean up immediately such trackout from areas accessible to the public including curbs, gutters, and sidewalks when trackout extends a cumulative distance of 25 linear feet or more and at the end of the day for all other trackout." Similar requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.

Please do not hesitate to contact me if I can provide any elaboration on these comments.

Sincerely,

Dena Konopka
Planner

Maricopa County
Air Quality Department

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November 19, 2009

Ms. Lisa Tomczak
Environmental Program Specialist
Air Quality Division, Planning Unit
Arizona Department of Environmental Quality

Dear Ms. Tomczak,

Thank you for the opportunity to review the "Draft Dairy Best Management Practices to Reduce PM_{10} Emissions". Maricopa County's comments on the draft document are listed below.

General Comments:

1. Please provide references (with page numbers) for the emission factors and control efficiencies shown in the document.

2. On page 1, in paragraph 2, the 2nd sentence is unclear. The 2nd sentence states "Retroactive to June 1, 2009, it also stipulates that rules adopted that regulate animal agriculture and commercial farming in future PM_{10} nonattainment areas be adopted through the Committee BMP process." It would be clearer to state that the legislation defined "Regulated area" to include "any other PM_{10} particulate nonattainment area established in this state on or after June 1, 2009."

3. In the table on page 2, please add a column noting the source of the best management practices (BMP) (e.g. San Joaquin Valley Air Pollution Control District, South Coast Air Pollution Control District, Imperial Valley, etc.). If the BMP is new and not in place in another area, please note this.

4. Maricopa County Rule 310.01 (Fugitive Dust from Non-Traditional Sources of Fugitive Dust), Section 302.8 (Livestock Activities) contains the following visible emission requirements. Equivalent requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.
   – 20% opacity limit for unpaved access connections, unpaved feed lane access areas, corrals, pens, and arenas (Section 302.8(a)(1) and (2)), and
   – Limit on visible emissions beyond the property line (Section 302.8(a)(3)).

5. On page 2 of the document, in the last row of the table "Select at least two BMP's from each section to reduce PM_{10} emissions", how was the 5.215 lb PM_{10}/head-yr derived?

6. Draft BMPs that only address VOC and NH_3 emissions should be eliminated from the list. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has developed a document entitled "Dairy Potential BACT Requirements and Mitigation Measures" that separates dairy measures by activity and pollutant. This document should be consulted for future refinements to the dairy BMPs.

7. What is the basis for the "animal feeding" BMPs (Feed high moisture feeds, Add water to ration mix to achieve a 20% minimum moisture level, Add molasses or tallow to ration mix at a minimum of 1%, feed green-chop to increase wetness of manure in corrals)? These are not contained in the SJVAPCD Conservation Management Practices (CMP) program nor are they

contained in Imperial Valley's Dairy Mitigation Measures. What is the basis for the 10% control efficiency? Do these measures reduce PM_{10}, NH_3, or VOC? If these are NH_3 or VOC measures, how effective are they in reducing PM_{10} in Arizona which is dominated by coarse fraction PM_{10}. These BMPs should be removed from the list unless data supporting their effectiveness at controlling or reducing PM_{10} emissions can be provided.

Comments on Unpaved Access Connection BMPs

8. On pages 2 and 3, "unpaved access connection" is defined as "any unpaved **private** road connection with a paved public road." However, Maricopa County Rule 310.01 does not make a distinction between "private" vs. "public" unpaved road connections. Rule 310.01 defines "Unpaved Access Connections" as "Any unpaved road connection with a paved public road". The inclusion of "private" limits the applicability of the BMPs. How does this proposed definition affect dairy operations that occur on leased state land or leased public land?

9. On page 2 and 3, the following three BMPs are actually "unpaved road" BMPs and used alone are not sufficient to reduce or control PM_{10} emissions from "unpaved access connections" (e.g. trackout):
   – Install signage that prohibits vehicular speeds in excess of 15 mph;
   – Install speed control devices (e.g., speed bumps);
   – Restrict access to thru traffic by posting signs or installing gates.

   These BMPs should either be removed from this category or combined into one BMP similar to the control option available in proposed Maricopa County Rule 310.01, Section 302.8(b)(1)(d): "Limit vehicle trips to no more than 20 per day per road, limit vehicle speeds to no more than 15 miles per hour, and restrict public access to private roads by installing barriers, curbs, fences, gates, posts, or signs written in compliance with ordinance(s) of local, county, State, or Federal sign standards."

10. On page 3, the discussion in the 2nd paragraph was taken from SJVAPCD's Emission Reduction Calculation Methodology for Speed Limits[1]; however, in their discussion, SJVAPCD clearly states that "speed limits" apply to unpaved roads and unpaved equipment and traffic areas. Arbitrarily applying SJVAPCD's speed limit description and control efficiency to "unpaved access connections" is inappropriate. The 2nd paragraph should be removed as it does not apply to "Unpaved Access Connections ".

11. The following two controls options currently proposed in Maricopa County Rule 310.01, Section 302.8(b)(1) for unpaved access connections should be added to the list of BMPs for "unpaved access connection":
    – Apply and maintain pavement, gravel (maintained to a depth of four inches), or asphaltic roadbase.
    – Apply and maintain dust suppressants other than water.

12. In regard to the "At all exits; install gravel pad, Grizzly, wheel wash system, pavement or other track-out control device between all unpaved road connection and paved public road" BMP, the word "other" should be removed or the BMP should be revised to specify that the track-out control device must be "a suitable trackout control device that controls and prevents

[1] San Joaquin Valley Air Pollution Control District, Conservation Management Practices Program Report for 2005, January 19, 2006, p. 1 Speed Limits 11/05.

trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site".

13. The livestock activity provisions contained in Maricopa County Rule 310.01, Section 302.8 include a 20% opacity limit for "unpaved access connections" (Section 302.8(a)(1)) and a limit on visible emissions beyond the property line (Section 302.8(a)(3)). Similar requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.

14. Maricopa County Rule 310.01 Section 302.8(c)(3)requires "If trackout occurs, the owner and/or operator shall repair and/or replace the control measure(s) and shall clean up immediately such trackout from areas accessible to the public including curbs, gutters, and sidewalks when trackout extends a cumulative distance of 25 linear feet or more and at the end of the day for all other trackout." Similar requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.

Comments on Unpaved Road or Feed Lane BMPs

15. The three BMPs for reducing speed (Install engine speed governors…, Install signage that prohibits vehicular speeds in excess of 15 mph, Install speed control devices) and the restrict access BMP (Restrict access to thru traffic by posting signs or install gates) need to be combined into one BMP similar to the control option available in proposed Maricopa County Rule 310.01, Section 302.8(b)(1)(d): "Limit vehicle trips to no more than 20 per day per road, limit vehicle speeds to no more than 15 miles per hour, and restrict public access to private roads by installing barriers, curbs, fences, gates, posts, or signs written in compliance with ordinance(s) of local, county, State, or Federal sign standards."

    Additionally, as currently written these BMPs only specify the requirement to "install" signage, speed control device, etc. Any BMP with a requirement to "install" needs to also specify the requirement to "maintain" the signage, speed control device, access restriction, etc.

16. Proposed Maricopa County Rule 310.01, Section 302.8 (b)(1)(a) requires "apply water **AND** install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site". Consequently, to prevent SIP relaxation and backsliding the "water roads" BMP needs to be revised to include "and install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site".

17. Applying oil to roads may have a water quality impact; therefore, this BMP needs to specify the types of oil that are allowed and also specify that "used oil" is not allowed.

18. The "Use gravel, rock, grindings" BMP needs to be revised as follows to make this BMP equivalent to the control option currently available in Maricopa County Rule 310.01, Section 302.8(b)(1)(b):
    – Replace "use" with "Apply and maintain".
    – Replace "gravel" with "gravel (to a depth of four inches)".
    – Add "asphaltic roadbase" as an option.

19. The BMP "apply dust suppressants" should be revised to "Apply and maintain dust suppressants other than water" similar to the option available in proposed Maricopa County Rule 310.01, Section 302.8(b)(1)(c).

20. On pages 2 and 4, the emission factor shown for "unpaved roads" is .123 lb/head-yr.; however, the SJVAPCD emission factor for "unpaved roads" is .369 lb/head-yr.[2] Please explain the discrepancy.

Comments on Animal Feeding, Waste Handling and Transporting BMPs

21. On pages 2 and 7, "Animal Feeding," should be removed from the category title and from the discussion and "animal feeding" BMPs should be removed from the tables on pages 2 and 7. Senate Bill 1225 listed this category as "Animal waste handling and transporting" not "Animal Feeding, Waste Handling and Transporting". The animal feeding BMPs (Feed high moisture feeds, Add water to ration mix to achieve a 20% minimum moisture level, Add molasses or tallow to ration mix at minimum of 1%, Cover all silage piles, and Store silage in bunkers) should be moved to a separate "Animal Feeding" category, if data supporting their effectiveness at controlling or reducing PM_{10} emissions can be provided. See comment #7 for additional comments related to "animal feeding" BMPs.

22. MCAQD Rule 310.01, Section 302.8(b)(2)requires <u>all</u> four of the control measures listed below to be implemented for "bulk material hauling, including animal waste, off-site and crossing and/or accessing an area accessible to the public":
– Load all vehicles used to haul bulk material, including animal waste, such that the freeboard is not less than three inches:
– Prevent spillage or loss of bulk material, including animal waste, from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s);
– Cover cargo compartment with a tarp or other suitable closure; and
– Install, maintain, and use a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of motor vehicles that traverse the site.

In order to prevent SIP relaxation and backsliding, the "Cover manure hauling trucks prior to exiting dairy" BMP will need to be revised to include all four control measures noted above.

23. Revise the BMP "Do not load manure trucks with dry manure when wind exceeds 25 mph" to a lower wind speed, perhaps 10 mph. Also, this BMP may be an available option, however, the four material hauling control measures contained in Rule 310.01, Section 302.8(b)(2) and noted above in comment #22 would need to also be implemented in order to prevent SIP relaxation and backsliding.

24. On page 2, the emission factor shown for "Animal Feeding, Waste Handling and Transporting" is .123 lb/head-yr.; however, SJVAPCD emission factor for "corral/manure handling" and "overall management/feeding" is 4.6 lbs/head-yr (open corral).[3] Please explain the discrepancy.

Comments on Arena, Corral and Pen BMPs

25. What is the source for the 60% control efficiency for "Use free-stall housing with concrete surface for animal housing/feeding areas to allow frequent manure removal"? The SJVAPCD Emission Reduction Calculation Methodology for Dairies and Feedlots CMP states on pg. 5 that "No data could be found in the literature on which to base control efficiency factor for

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[2] San Joaquin Valley Air Pollution Control District, Conservation Management Practices Program Report for 2005, January 19, 2006, p. 6 AFO DF 11/05.
[3] Ibid.

these practices. The District has conservatively assumed a minimal 10% control effectiveness."

26. The following BMPs are all related to increasing stocking density and should be combined in to one BMP: "Increase stocking density in corrals to increase manure moisture". Additionally, this BMP needs to specify either the percent shade coverage required and the targeted stocking density necessary. Dr. Auvermann mentioned that there are shade and stocking density specifications that need to be met for effective control.
–Provide shade in corrals to increase stocking density
–Provide cooling in corrals to increase stocking density
–Increase stocking density in corrals to increase manure moisture

27. In regard to the "Add moisture to manure through coolers or fence line spraying during hot dry weather". First, this BMP should be revised to "Sprinkle or Sprinkling of Open Corral" similar to SJVAPCD's CMP. Second, this BMP needs to include a target moisture control of 20% and a target watering to a depth of 1/10 to 1/4 inch per day in accordance with Dr. Auvermann's recommendations. Lastly, the caveat "during hot dry weather" needs to be removed because it is vague and the 20% moisture control needs to be maintained year-round not just during hot dry weather.

28. The following BMPs appear to be very similar but are listed as separate BMPs. These should be combined into one BMP: "Frequent scraping and/or manure removal"
–Frequent manure removal (every 6 months) with equipment that leaves an even corral surface of compacted manure on top soil.
–Scrape and harrow pens regularly

    Additionally, the frequency of manure removal does not appear to meet optimal frequency based on Dr. Auvermann's recommendation and SJVAPQD's Dairy Potential BACT Requirements and Mitigation Measures. Dr. Auvermann recommended between 3 and 6 times per year based on overall annual depth requirement. SJVAPQD's "Dairy Potential BACT Requirements and Mitigation Measures" document requires "Weekly scraping and/or manure removal using a pull type manure harvesting equipment in morning hours when moisture in air except during period of rainy weather" as a PM_{10} mitigation measure.

    Lastly, in addition to specifying the optimal scraping and manure removal frequency, the ideal depth needs to be specified as well. SJVAPQD's description of "Frequent Scraping and/or Manure Removal" states "Keeping the dusty manure depth less than one inch above the ground, and therefore keeping the corral surface thin and well compacted reduces PM emissions."

29. The "Flush, scrape, or vacuum lanes daily" BMP is listed in SJVAPQD's "Dairy Potential BACT Requirements and Mitigation Measures" as a VOC and NH_3 mitigation measure rather than a PM_{10} measure (see "Feed lanes and walkways to be flushed four times a day, scraped four times daily, or vacuumed four times daily). Draft BMPs that only address VOC and NH_3 emissions, such as this BMP, should be removed from the list.

30. In regard to the "Scrape and harrow pens regularly", SJVAQCD's "Scraping/harrowing" CMP is described as meaning "to scrape and harrow manure in morning hours when moisture and humidity is higher". How effective will simply "scraping and harrowing pens regularly" be in reducing PM_{10}?

31. The "Use drag equipment instead of push equipment to maintain pens" BMP should be combined with the "Frequent manure removal with equipment that leaves an even corral surface of compacted manure on top of the soil" similar to SJVAPCD's PM_{10} mitigation measure "Weekly scraping and/or manure removal using a pull type manure harvesting equipment in morning hours when moisture in air except during period of rainy weather" (see SJVAPCD's Dairy Potential BACT Requirements and Mitigation Measures document).

32. What is the basis for the "Pile manure between cleaning" BMP? This measure is not contained in the SJVAPCD CMP program nor is it contained in Imperial County's Dairy Mitigation Measures. What is the basis for the 10% control efficiency? How does this measure reduce PM_{10}? This BMP should be removed from the list unless data supporting its effectiveness at controlling or reducing PM_{10} emissions can be provided.

33. In regard to the "Do not run cattle" BMP, Dr. Auvermann stated in his presentation that "animal behavior changes" are hard to implement and not always effective. Because this BMP is not contained in any other EPA approved CMP program and Dr. Auvermann stated this type of control is not always effective, this BMP should be removed from the list.

34. In regard to "Plant tree windbreak" and "Stack hay to create windbreak" BMPs, these need to specify "install within 50 feet to 100 feet of corrals, pens, and arenas" similar to Maricopa County Rule 310.01 Section 302.8(b)(3)(b).

35. The livestock provisions contained in Maricopa County Rule 310.01, Section 302.8 include a 20% opacity limit for "corrals, pens, and arenas" (Section 302.8(a)(2)) and a limit on visible emissions beyond the property line (Section 302.8(a)(3)). Similar requirements will be necessary for livestock activities in the Agricultural BMP rule to prevent SIP relaxation and backsliding.

36. MCAQD Rule 310.01, Section 302.8(b)(3) allows "Apply a fibrous layer (i.e., wood chips) in working areas" as a control measure for "corrals, pens, and arenas" and SJVAPCD allows this CMP for "manure handling". Why is this control measure not a BMP option for dairies?

Please do not hesitate to contact me if I can provide any elaboration on these comments.

Sincerely,

Dena Konopka
Planner

cc:
Mike Billotte, United Dairymen of Arizona

Ken Buchanan
Assistant County Manager

Development Services

Don Gabrielson
Air Quality Director

Terry Doolittle
County Manager

PINAL • COUNTY
wide open opportunity

November 20, 2009

via E-Mail and First Class Mail

Earl Petznick, Co-chair
Kevin Rogers, Co-chair
Arizona Agricultural Best Management Practices 2009 Technical Workgroup
c/o Nancy Wrona, Director
Air Quality Division
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

Re: Proposed feedlot BMPs

Dear Mssrs. Petznick & Rogers:

Thank you for the opportunity to comment on this proposal.

I attach a comment-memorandum, including supporting information. Briefly, the comment:

- Reaffirms Dr. Auvermann's conclusion that control of late-afternoon PM-10 emissions is critical;

- Speaks to the question of whether feedlot emission reductions should be addressed in relative or absolute terms, with the conclusion that developing a future compliance demonstration will require an assessment of reductions in real terms;

- Posits that adequate watering of feed pens should constitute an obligatory baseline measure for all feedlots; and

- Posits that every operator embracing a "best management practices" program should publicly account for their participation and performance.

If you have any questions, please contact either Scott DiBiase at 520-866-6969 or me at 520-866-6915.

Sincerely yours,

Don Gabrielson
Director
Pinal County Air Quality

enc.

cc w/enc. via e-mail: Supervisor Pete Rios
Supervisor David Snider
Supervisor Bryan Martyn
Bas Aja, ACFA
Rick Lavis, ACGA

SB 1225
Agricultural BMP Process

Pinal County Comment
On Proposed Feedlot BMPs

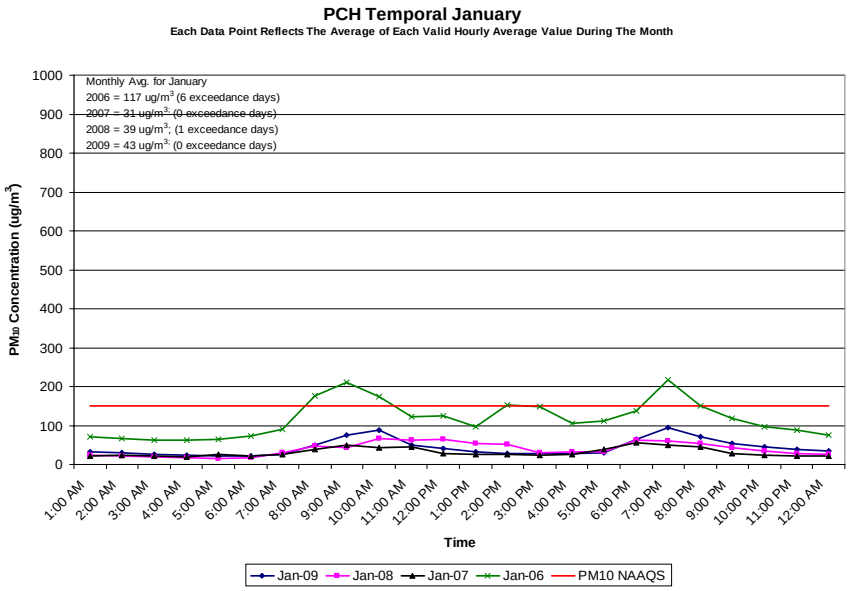
11/20/2009

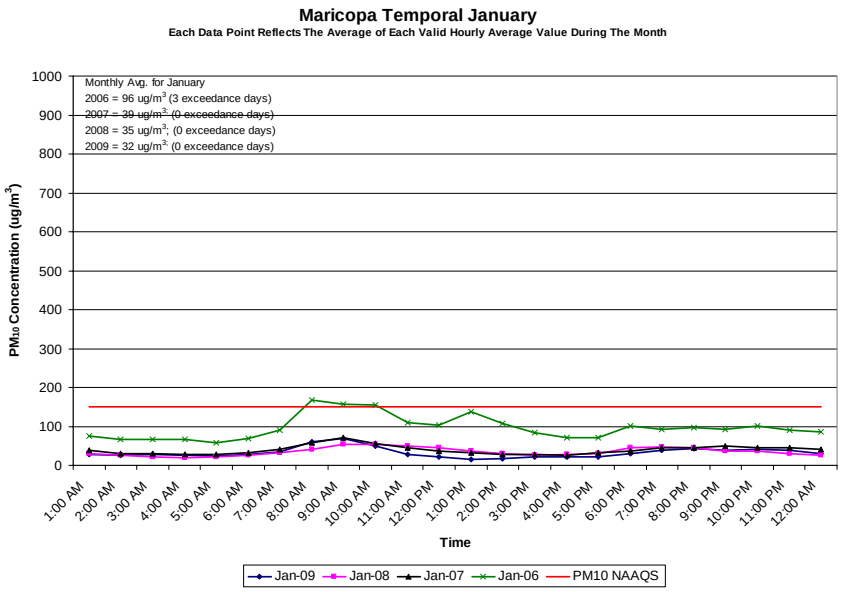
Comment Outline

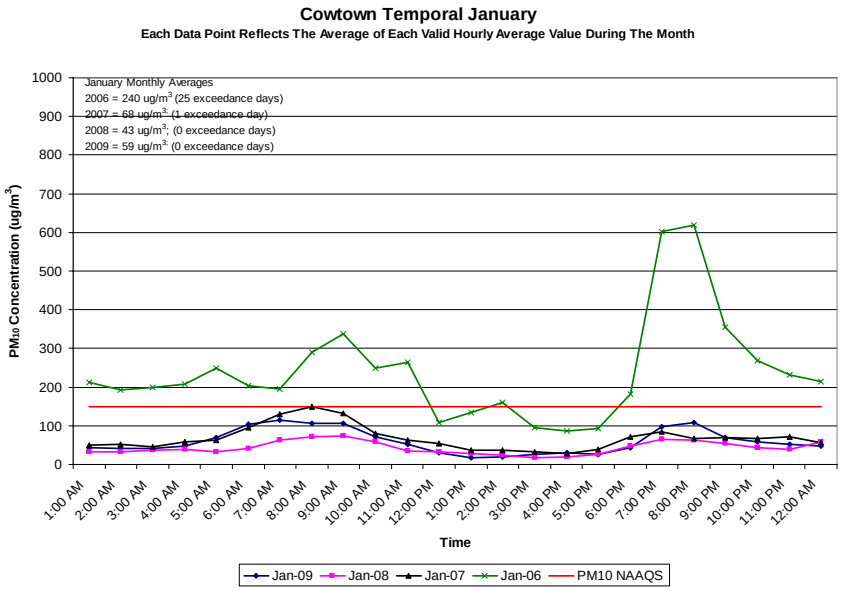
- Supplement to Dr. Auvermann's data
  - Hourly-average data from Pinal
  - Speciation study; particulate composition at feedlots
  - Conclusion
- Are relative or absolute improvements required?
  - SIP requirements
  - Analysis of 10/21/09 Cowtown PM-10 exceedance
  - Conclusion
- Proposed Feedlot BMPs
  - Question regarding basis for proposed reduction coefficients
  - Watering pens should be an obligatory measure
- Implementation of all BMPs should include accountability
  - At a minimum, public disclosure and reporting

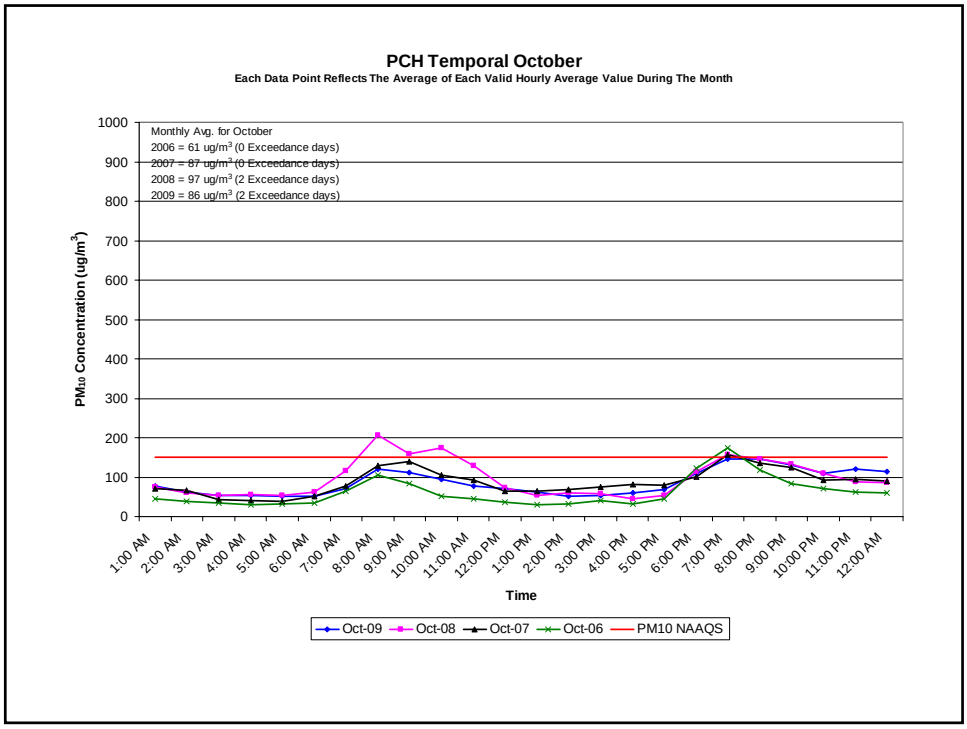
Pinal-County Supplement
to Dr. Auvermann's "Hourly" Data

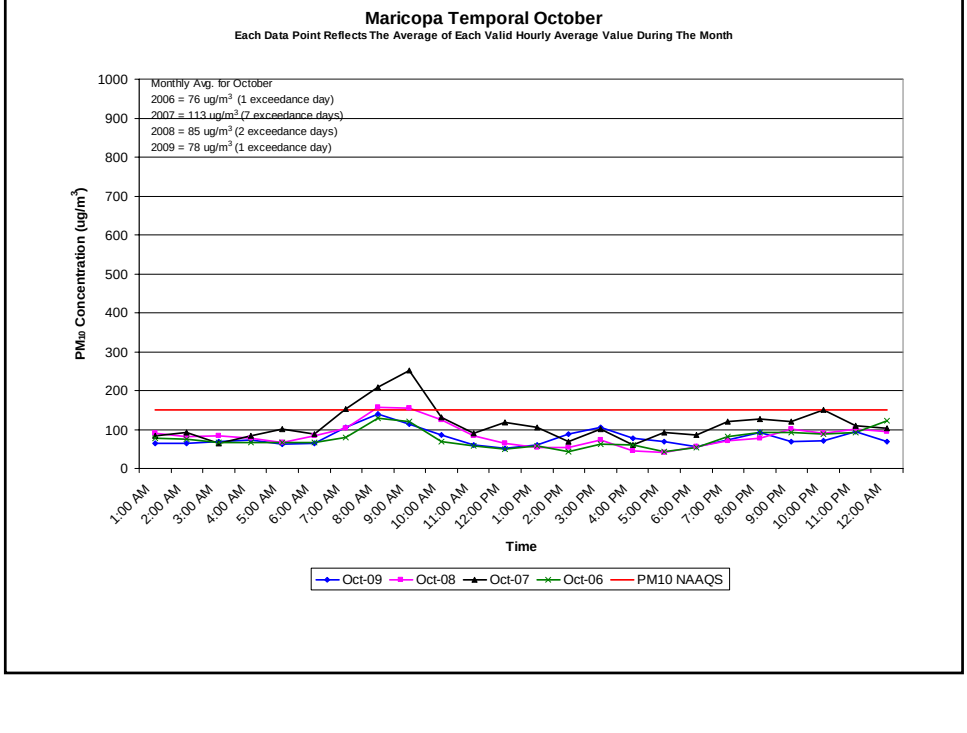
- Plots of month-specific hourly PM-10 averages for '06, '07, '08 and '09
- Three different sites
  - Pinal County Housing ("PCH") – rural bkg.
  - City of Maricopa – urban core
  - Cowtown – adjoins feedlot
- Two different months
  - January
  - October

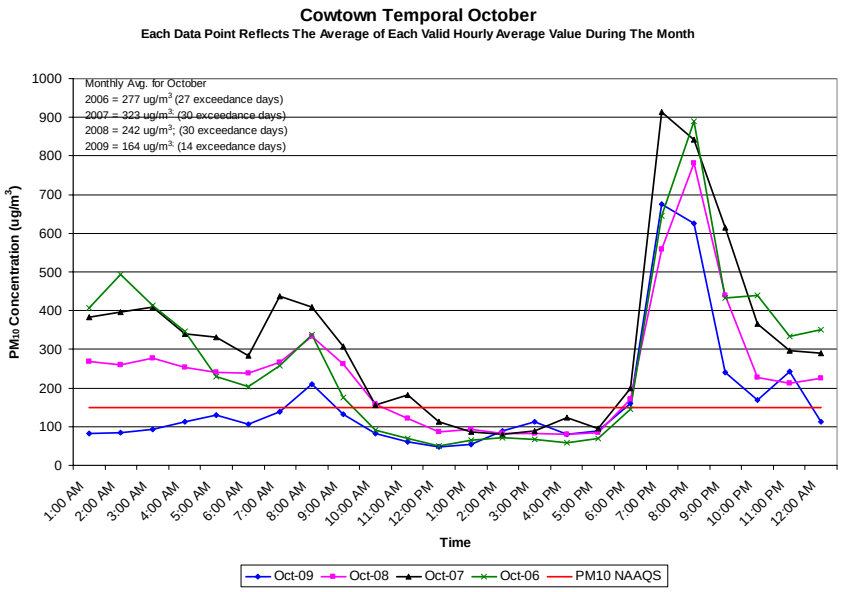



Maricopa Temporal January
Each Data Point Reflects The Average of Each Valid Hourly Average Value During The Month
Monthly Avg. for January
2006 = 96 ug/m3 (3 exceedance days)
2007 = 39 ug/m3, (0 exceedance days)
2008 = 35 ug/m3, (0 exceedance days)
2009 = 32 ug/m3, (0 exceedance days)
PM10 Concentration (ug/m3)
Time
Jan-09
Jan-08
Jan-07
Jan-06
PM10 NAAQS

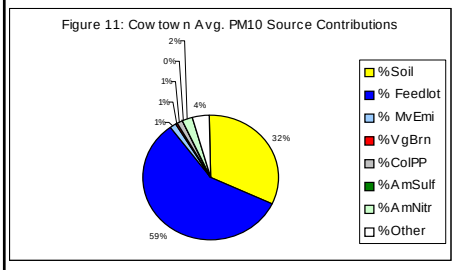

Cowtown Temporal January
Each Data Point Reflects The Average of Each Valid Hourly Average Value During The Month
January Monthly Averages
2006 = 240 ug/m3 (25 exceedance days)
2007 = 68 ug/m3, (1 exceedance day)
2008 = 43 ug/m3, (0 exceedance days)
2009 = 59 ug/m3, (0 exceedance days)
PM10 Concentration (ug/m3)
Time
Jan-09
Jan-08
Jan-07
Jan-06
PM10 NAAQS

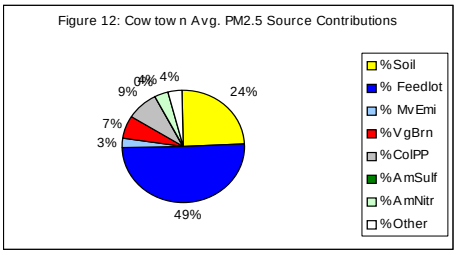

PCH Temporal October
Each Data Point Reflects The Average of Each Valid Hourly Average Value During The Month
Monthly Avg. for October
2006 = 61 ug/m3 (0 Exceedance days)
2007 = 87 ug/m3 (0 Exceedance days)
2008 = 97 ug/m3 (2 Exceedance days)
2009 = 86 ug/m3 (2 Exceedance days)
PM10 Concentration (ug/m3)
Time
Oct-09
Oct-08
Oct-07
Oct-06
PM10 NAAQS


Maricopa Temporal October
Each Data Point Reflects The Average of Each Valid Hourly Average Value During The Month
Monthly Avg. for October
2006 = 76 ug/m3 (1 exceedance day)
2007 = 113 ug/m3 (7 exceedance days)
2008 = 85 ug/m3 (2 exceedance days)
2009 = 78 ug/m3 (1 exceedance day)
PM10 Concentration (ug/m3)
Time
Oct-09
Oct-08
Oct-07
Oct-06
PM10 NAAQS



Data Supplement
2005 Pinal PM Speciation Study





- **Feedlot emissions (i.e. manure particulates) were quantified by conducting a chemical mass balance analysis of monitoring filters, with feedlot emissions identified by a chemical "fingerprint" developed from samples taken from pens in the adjoining feedlots.**
- **Conclusion – At Cowtown, manure constitutes the dominant fraction of airborne particulate matter.**

Data Supplement Conclusion

- Local concentrations at the feedlot monitor show a specific pattern of hourly concentrations, corresponding to cattle movement
- 2009 data shows marked improvement over prior years
- Speciation study shows that feedlot emissions dominate local impacts @ Cowtown
- Even with improvements, 2009 Cowtown data shows consistent violation of the 24-hour PM-10 NAAQS

Absolute or Relative Reductions? What does the CAA require?

- A “moderate area” nonattainment designation triggers a requirement for a curative SIP
- A SIP requires that significant sources all implement reasonably available control measures or RACM
    - Relative improvement may justify RACM
- A SIP must ALSO include an attainment demonstration
  - Looking back - historical assessment of emissions
    - A baseline annual inventory
    - A “design-day” site-specific inventory
  - Looking forward – attainment showing based on projected future emissions
    - An attainment-day annual inventory reflecting absolute reductions
    - An attainment day daily inventory reflecting absolute reductions at the “design-day” site
    - A modeling analysis reflecting those reductions, showing attainment

Relative or Absolute Reduction?

PM-10 Case Study - 10/21/2009 (Part 1)

- **Will ag BMPs be adequate to project future attainment?**
- **Irreducible background in Pinal County (presumed) = 20 µg/m^3**
- **At Pinal County Housing (rural background site)**
  - October 21 concentration = 84 µg/m^3 *(See next slide)*
    - Local contribution (w/o background) = 84 – 20 = 64 µg/m^3
    - Estimated contribution is 60% dirt roads and 40% ag
      - 40% of 64 µg/m^3 = 26 µg/m^3 from agriculture
- **At Cowtown October '09 results refect improved (BMP level?) measures**
  - October 21 concentration = 212 µg/m^3 *(See 2nd following slide)*
    - Local contribution (w/o background) = 212 – 20 = 192 µg/m^3
  - Net local contribution from Cowtown
    - Local contribution – rural background = net local contribution
      - Feedlot contribution = 192 – 64 = 128 µg/m^3

PINAL CO HOUSING PM_{10} 2009 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	32.0	42.2	72.1	62.8	83.4	47.6	59.4	71.8	93.6	84.1	77.7	0.0
2	46.4	52.0	80.4	66.1	85.3	47.2	25.1	58.0	45.2	81.8	120.1	0.0
3	40.3	63.4	102.0	**381.0**	57.3	61.3	31.4	64.7	88.5	48.0	126.3	0.0
4	17.5	73.2	72.3	51.2	62.4	65.1	12.1	117.8	23.8	**167.4**	176.6	0.0
5	7.7	65.3	61.1	46.2	69.7	79.2	23.2	**291.1**	19.1	70.0	135.3	0.0
6	17.8	35.5	66.2	79.1	68.2	50.4	32.6	59.8	35.4	85.0	182.5	0.0
7	23.3	23.2	41.3	52.9	73.9	45.9	49.3	73.7	24.8	68.8	109.7	0.0
8	34.6	5.2	70.1	80.9	75.0	50.3	48.1	78.8	36.0	67.2	77.5	0.0
9	45.3	68.2	25.3	63.5	70.0	56.1	50.0	61.6	25.9	80.2	105.3	0.0
10	29.4	11.1	29.7	113.2	67.0	27.5	77.5	104.2	44.5	106.5	128.2	0.0
11	23.4	14.3	42.2	12.0	85.9	38.6	54.8	89.4	47.4	67.7	93.2	0.0
12	72.2	19.1	53.9	17.0	64.8	35.8	50.7	**169.0**	72.9	43.7	65.6	0.0
13	82.1	21.2	54.5	45.8	63.9	58.2	**213.7**	73.9	51.1	51.6	66.3	0.0
14	72.5	19.1	55.9	100.6	81.5	40.7	49.3	59.4	50.8	76.5	20.3	0.0
15	75.9	23.7	48.5	**161.5**	82.2	35.8	81.3	44.0	87.3	84.5	19.8	0.0
16	72.5	23.4	72.2	39.6	64.1	63.3	65.1	42.6	36.4	91.1	37.5	0.0
17	58.4	8.8	91.6	47.1	103.5	62.4	**1444.7**	108.1	62.2	67.6	0.0	0.0
18	45.8	12.9	79.1	43.3	124.7	48.0	65.8	108.8	41.9	50.7	0.0	0.0
19	55.4	21.8	80.5	45.2	73.2	85.1	**167.9**	101.5	98.3	51.7	0.0	0.0
20	71.9	33.5	109.0	43.3	41.0	29.8	120.5	106.1	58.3	70.6	0.0	0.0
21	93.2	36.9	55.4	59.2	27.2	42.2	120.1	168.1	59.0	84.3	0.0	0.0
22	18.3	49.4	**170.6**	55.2	19.7	51.8	139.1	19.9	63.4	92.7	0.0	0.0
23	11.9	66.1	96.4	67.3	23.3	61.3	58.6	17.5	69.2	97.1	0.0	0.0
24	12.3	57.6	86.8	63.7	30.3	64.4	75.7	45.5	71.5	87.2	0.0	0.0
25	14.3	59.5	58.4	88.5	34.7	57.6	99.5	43.6	62.8	62.1	0.0	0.0
26	22.8	54.2	**337.1**	51.5	37.5	61.4	29.6	104.5	66.2	73.7	0.0	0.0
27	30.9	59.1	44.0	87.2	51.8	60.2	43.6	101.1	61.5	**798.5**	0.0	0.0
28	56.8	55.4	85.1	92.3	74.6	55.8	48.5	82.1	110.9	113.0	0.0	0.0
29	36.9		68.6	59.7	103.2	63.4	89.6	56.0	77.0	62.9	0.0	0.0
30	66.9		63.9	67.0	59.0	91.9	74.9	92.7	78.9	76.5	0.0	0.0
31	50.5		72.5		42.6		65.5	69.4		138.4		0.0

Red = stagnation day, yellow = windy day

COWTOWN PM_{10} 2009 TEOM Data

24 Hour Averages (ug/m^3)

	January	February	March	April	May	June	July	August	September	October	November	December
1	37.9	111.2	64.6	100.3	100.1	130.6	65.5	122.6	44.7	171.9	212.9	0.0
2	53.6	90.5	140.0	71.1	92.9	AN	64.3	82.3	73.9	136.6	155.4	0.0
3	30.8	128.6	106.7	199.4	67.0	AN	63.7	125.0	426.2	52.9	153.1	0.0
4	28.5	205.2	77.7	95.5	108.5	AN	16.4	199.6	34.0	98.1	286.1	0.0
5	21.9	182.6	77.2	72.5	131.1	108.5	24.1	158.7	23.4	242.4	136.5	0.0
6	31.1	78.3	103.0	71.1	135.5	101.7	53.7	114.2	26.5	146.9	189.6	0.0
7	27.3	59.0	72.9	109.6	104.1	92.0	45.2	112.7	27.5	87.3	121.9	0.0
8	31.1	9.8	125.1	105.4	109.1	117.6	60.7	90.3	43.5	176.9	62.0	0.0
9	45.4	33.7	55.1	74.0	110.3	112.4	60.0	81.5	58.3	107.0	102.6	0.0
10	24.4	14.8	78.0	94.9	119.5	57.0	128.5	122.1	55.9	101.2	137.7	0.0
11	39.3	22.2	97.2	21.4	114.0	87.5	98.9	159.8	87.3	193.8	163.9	0.0
12	55.0	53.8	78.3	44.0	113.8	88.6	131.0	235.3	60.6	92.1	165.1	0.0
13	53.8	40.4	86.2	38.6	160.1	117.8	130.2	35.2	51.6	108.2	102.1	0.0
14	60.1	34.5	86.2	70.3	111.1	154.2	84.5	38.0	79.3	71.2	64.9	0.0
15	96.6	40.3	67.1	138.4	90.8	87.0	74.1	92.1	89.1	155.4	31.2	0.0
16	145.1	57.9	62.6	57.9	168.2	154.8	65.9	52.0	91.3	226.2	43.1	0.0
17	135.8	23.4	124.2	67.5	98.8	115.9	631.0	124.5	108.2	91.1	0.0	0.0
18	76.5	26.5	112.3	92.5	72.2	131.0	252.1	148.0	57.6	88.0	0.0	0.0
19	42.2	40.7	82.8	179.5	90.5	103.0	87.2	86.8	97.9	133.1	0.0	0.0
20	64.3	43.1	132.8	136.7	73.6	59.9	300.0	96.3	115.1	144.5	0.0	0.0
21	93.8	45.1	82.6	84.3	43.9	119.8	268.3	204.7	128.7	212.8	0.0	0.0
22	20.0	50.2	332.1	118.1	23.7	106.8	79.6	21.4	69.7	135.0	0.0	0.0
23	22.7	82.3	134.4	84.0	23.9	151.2	65.4	45.1	111.1	235.1	0.0	0.0
24	19.7	80.0	75.7	138.8	57.0	135.3	59.0	91.1	184.4	134.8	0.0	0.0
25	20.7	66.7	94.0	157.3	119.0	104.8	53.0	AN	210.9	149.4	0.0	0.0
26	77.0	74.8	224.6	156.7	105.7	135.8	46.4	AN	212.8	178.7	0.0	0.0
27	74.4	72.2	79.7	159.4	77.9	118.4	90.8	123.3	130.8	626.3	0.0	0.0
28	108.1	71.7	109.3	96.8	82.0	76.5	141.4	479.1	154.1	242.3	0.0	0.0
29	59.7		94.1	129.9	98.5	81.8	122.5	135.6	118.8	219.2	0.0	0.0
30	82.3		158.3	124.6	82.2	96.5	114.6	152.2	242.0	174.9	0.0	0.0
31	134.1		85.5		165.2		88.5	224.8		174.6		0.0

Red = stagnation day, yellow = windy day

Relative or Absolute Reduction? Consider 10/21/2009 (Part 2)

- Under the status quo as it pertains to ag ….
  - Irreducible background = 20 µg/m^3
  - Background agriculture = 26 µg/m^3
  - Feedlots = 128 µg/m^3
  - 20 + 26 + 128 = 174 µg/m^3 = 116% of the PM-10 NAAQS
- Conclusion
  - Current conditions reflect improvement
  - But current conditions still fail to reach attainment
  - If current efforts reflect projected BMP-level efforts, additional absolute reductions at ag-BMP sources will be required to demonstrate future attainment

Comment on Feedlot BMPs Proposed on 11/4/09

- The proposed % control efficiencies should be justified by data or analysis
- Feedlot PM-10 emissions result from cattle movement in pens covered with dry manure, as demonstrated by:
  - Dr. Auverman's comments
  - Pinal monitoring data … note the recurring spikes in emissions in late afternoon concentrations
  - Pinal speciation study … 60% of emissions are manure
- Conclusion - Adequate watering in pens should be an obligatory baseline measure, not just an option

BMP Implementation Should Offer Transparency and Accountability

- In Pinal, a BMP program will cover sources that constitute a meaningful segment of the inventory
- Non-BMP sources are subject to rigid reporting and compliance verification requirements
- Conclusion - Sources operating under a ag BMP program should at least regularly publicly acknowledge:
  - Participation
  - Activity levels
  - Levels of commitment
  - Performance

Feedlot BMPs
Pinal Comments - Conclusion

- Data (Dr. Auvermann and Pinal) indicates that control of late-afternoon emissions is crucial
- Demonstrating future compliance will require quantification of emission reductions, not mere relative improvement
- Application of sufficient water should constitute an obligatory BMP for feedlots
- Implementation of (all) BMPs should include public reporting to demonstrate accountability

- For questions or additional background regarding Pinal County's comments, contact
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