



**Guide to Agricultural PM10
Best Management Practices**

“Agriculture Improving Air Quality”

Swine Operations

**Governor’s Agricultural
Best Management Practices Committee**

First Edition, 2015

Introduction:

Why is the Guide to Agricultural PM10 Best Management Practices needed?

The Federal Clean Air Act requires that emissions from all significant sources in areas not meeting the national ambient air quality standards be controlled through effective programs. Through a study conducted by the Arizona Department of Environmental Quality (ADEQ) in 1995, agricultural activities were identified as a source that contributes to the production of particulate matter (PM).

PM10 is particulate matter that is 10 micrometers or less in diameter. These particles are very small and can invade the natural defense mechanism of the human respiratory tract penetrating deep into the lungs (human hair is 70 micrometers in diameter). Consequently, PM can cause a wide variety of harmful health effects, especially for children, the elderly, and people with pre-existing respiratory or cardiovascular disease.

With this potential threat to human health, Arizona farmers and commercial animal operators have stepped up to the challenge to develop and implement a program to help meet the Federal Clean Air Act standards for PM.

The intent of this guide is to:

- Provide agricultural operators with information and guidance on how to effectively implement individual best management practices (BMPs).
- Inform the general public about the efforts local farmers are implementing to improve air quality.
- Provide Natural Resource Conservation Districts (NRCD) and other farm organizations with background information regarding the agricultural PM General Permit.
- Provide regulators with information and guidance on how to determine compliance with the agricultural PM General Permit.

Why was the Agricultural PM General Permit created?

The Phoenix metropolitan area has not met the Federal Clean Air Act Standards for PM10 since the Clean Air Act was revised in 1990. On June 10, 1996, the U.S. Environmental Protection Agency (EPA) re-designated the PM10 Regulated Area to serious for PM10, resulting in the need for emission reduction programs for previously unregulated sources, such as unpaved roads, unpaved parking lots, vacant lots and agriculture. On August 3, 1998, EPA issued a federal implementation plan (FIP) addressing these unregulated sources. The FIP included requirements to develop and enforce control measures for these source categories.

In an effort to address agriculture's contribution to PM10, the Governor's Agricultural Best Management Practices Committee was created by law in 1998 (Arizona Revised Statutes (A.R.S.) §49-457)). The committee is composed of five local farmers, the director of ADEQ, the director of Arizona's Department of Agriculture, the state conservationist for the Natural Resources Conservation Service (NRCS), the vice dean of the University of Arizona College of Agriculture and Life Sciences and a soil scientist from the University of Arizona. The committee's charge was to develop an agricultural PM10 general permit that would address the need for controls on agricultural operations. The committee was to identify BMPs that focused on feasible, effective and common sense practices that minimized negative impacts on local agriculture. In the original program, the agricultural PM10 general permit required that at least one BMP be implemented to control PM10 for each of the following categories: tillage and harvest, non-cropland, and cropland. Because A.R.S. §49-457 was developed and adopted, EPA removed the portion of the federal implementation plan for agriculture on June 29, 1999 [64 Federal Register p. 34,726].

In 2007 the Arizona State Legislature passed Senate Bill 1552, which mandated the expansion of the Ag BMP program by changing the number of BMPs required from one to two per category in the Maricopa County nonattainment area and the Maricopa County portion of Area A.

In 2009, the Arizona State Legislature passed Senate Bill 1225, amending A.R.S. §49-457 to include activities for dairy, beef cattle feedlots, and poultry or swine facilities. BMPs were added to the rule to include practices related to unpaved access connections; roads or feed lanes; animal waste (and feeding) handling and transporting; and arenas, corrals and pens. It also provided for the addition of one person actively engaged in each of the following; beef cattle feed lot, dairy, poultry and swine, as well as one person from a county air quality department, to the Governor's Ag BMP Committee.

On July 2, 2012, the EPA re-designated a portion of western Pinal County from "unclassified" to "nonattainment" for PM10. Arizona will be required to develop a plan in Pinal County to attain the air quality standard for PM10. The September 17, 2013 emission inventory for Pinal County indicated that significant emission reductions would be needed from agricultural activities to attain the PM standard.

Who must comply with the Agricultural PM10 general permit?

Any commercial animal operator located within the boundary of the Maricopa PM Nonattainment Area and Maricopa County portion of Area A, a PM nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area except on tribal land. A commercial animal operator is defined as: any dairy operation with more than 150 dairy cattle, any beef cattle feedlot with more than 500 beef cattle, any poultry operation with more than 25,000 egg laying hens, and any swine operation with more than 50 animal units.

What does the operator have to do?

- For commercial animal operators located in **Pinal County PM Nonattainment Area** and any **moderate** nonattainment area, facilities must implement and maintain at least **ONE** approved BMP (described later in this document) for each of the four categories: Arenas, Corrals, and Pens; Animal Waste (and Feed) Handling and Transporting; Unpaved Access Connections; and Unpaved Roads or Feed Lanes. **Commercial dairy** operators in **Pinal County** have **ONE** extra BMP to implement in the Unpaved Roads or Feed Lanes category. **Commercial beef feedlot** operators in **Pinal County** have **ONE** extra BMP to implement in the Arenas, Corrals, and Pens category.
- For commercial animal operators located in **Maricopa County PM Nonattainment Area and Maricopa County portion of Area A**, facilities must implement and maintain at least **TWO** approved BMP (described later in this document) for each of the four categories: Arenas, Corrals, and Pens; Animal Waste (and Feed) Handling and Transporting; Unpaved Access Connections; and Unpaved Roads or Feed Lanes.
- Must keep records detailing the BMPs selected for each category. The commercial animal operator may document the practice on the sample BMP agricultural PM permit record or develop a record that includes the information required by the Agricultural PM General Permit. The commercial operator must make available the record to the ADEQ director within two business days of notice to the operator.
- In **Pinal County**, beginning in Calendar year 2017, and no more than once every subsequent three calendar years, the commercial animal operator shall complete and submit a 3-Year Expanded Survey to the Arizona Department of Agriculture detailing the number of animals in the commercial facility, the total miles of unpaved roads, total acreage of unpaved access

connections, and the BMPs selected in each of the categories including the BMPs selected for high risk days. The first survey is due January 31, 2018 and every three years thereafter.

- The committee recommends additional record keeping if implementation of the BMPs is not easily visible. Examples of additional record keeping include, but are not limited to, photographs, purchase records, receipts, job sheets, contractor invoices, employee timesheets, logs, narrative statements, individual farm policies, statements of understanding signed by employees or contractors, and training records.
- There is no fee associated with the Agricultural PM General Permit.

When must the Agricultural PM10 General Permit be implemented?

A commercial animal operator engaged in agricultural activities before and after December 31, 2015 must comply with the Agricultural PM General Permit.

New legislation will require all producers located in a designated PM Nonattainment area that engage in agricultural activities to be in compliance by January 1, 2016. Any person who commences a regulated agricultural activity after January 1, 2016 must be in compliance as soon as the activity begins.

What will happen if I do not comply with the Agricultural PM General Permit?

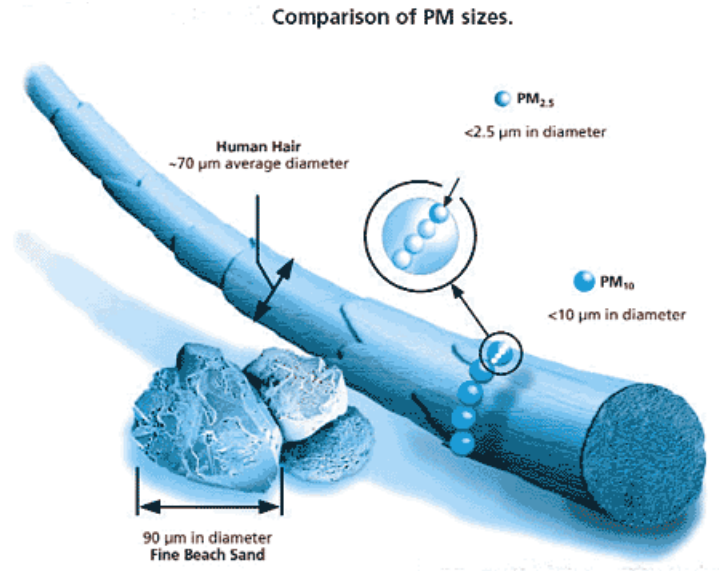
If the ADEQ Director determined that a commercial animal operator is not in compliance with the agricultural PM General Permit, the following three-stage process would occur as per A.R.S. 49-457(I)(J)(K):

1. If the commercial animal operator has not previously been subject to an agricultural PM General Permit related compliance order, the operator will be required to submit a plan to the local Natural Resource Conservation District (NRCD) within a period that the director determines is reasonable, but is not less than 60 days. The plan must specify the BMPs that the facility will use to comply with the General Permit.
2. If the commercial animal operator has previously been subject to an agricultural PM General Permit related compliance order, the operator will be required to submit a plan to ADEQ within a period that the director determines is reasonable, but is not less than 60 days. The plan must specify the BMPs that the facility will use to comply with the General Permit.
3. If the commercial animal operator fails to comply with the plan submitted to NRCD and ADEQ, the director of ADEQ may revoke the agricultural PM General Permit and require the operator to obtain an individual fee based permit.

At each stage, the farmer would have the opportunity for a hearing.

Soils, PM10 and Air Quality

Soils consist of various particles including mineral matter, organic matter, air, and water. These particles vary in shape and size, ranging from large drops of liquid to microscopic dust particles. The mineral particles in soil are classified as sand, silt, or clay. Soils containing high amounts of clay coupled with large silt particles have a greater likelihood of generating PM10. The term PM10 is used to describe particles of 10 micrometers or less in aerodynamic diameter. By comparison, the diameter of the average human hair is 70 micrometers, making human hair about seven times the size of PM10.



When the natural soil structure is manipulated or disturbed by tillage, animals, weather, or vehicular traffic, the structure can be broken apart from larger pieces, or clods, into smaller pieces. This process significantly increases the potential for soil particles to become suspended in the air. Further manipulation of the soil increases the chance for smaller particles to become PM10.

Air quality problems occur when the amount of particles released into the air increase in concentration. Large concentrations of PM10 can potentially violate one of the federal air quality standards, or National Ambient Air Quality Standards (NAAQS), set for various air pollutants. The current NAAQS standard for PM10 is 150 micrograms/cubic milliliter averaged over 24 hours. This standard is a concentration by weight measure. PM10 emissions can also cause visibility impairment (e.g., Brown Cloud) as well as health impacts. The small particles can pass through nostril hairs and enter the lungs, penetrating deep into the lung tissue where it is lodged and not easily, if ever, expelled.

Two meteorological events have the potential to increase the impacts from high concentrations of PM10: high winds and inversions. Conditions for both of these events can occur in PM regulated areas, one occurring predominantly in the warmer season, the other in the cooler season. Warm season high wind events are generally short (less than one hour) and are the result of the downdrafts from monsoon thunderstorms. The cool season events are longer (six to 12 hours) and are the result of strong pressure gradients associated with a trough or a cold frontal system.

An inversion is a region in the atmosphere where the temperature increases with height. The presence of an inversion creates a very stable atmosphere and leads to very little mixing of the air, trapping pollutants close to the ground. An inversion is also produced whenever radiation from the surface exceeds the amount of radiation from the sun – commonly at night or in the winter when the angle of the sun is very low in the sky. Some of the best management practices outlined in this booklet address how to lower PM10 so these events do not increase PM10 concentrations.

Disturbed soil that is broken down into smaller particles can also become a soil conservation problem. Many of the best management practices outlined in this booklet are already used to prevent soil erosion. Other best management practices address ways of limiting particles from associated activities such as adjoining dirt roads or road shoulders. The manipulation or disturbance of soil is inherent to agriculture. Best management practices are not designed to eliminate particle emissions 100 percent, but they are designed to reduce the activities that can lead to the increased concentration of PM10.

Best Management Practices

As a result of discussions between the EPA, Arizona Department of Environmental Quality, and the Arizona Department of Agriculture, the Arizona State Legislature in 1999 enacted legislation with the full support of the Arizona agriculture community to create and implement a Best Management Practice Program. The Agricultural Best Management Practice Program allows growers, commercial animal operators and irrigation districts a wide range of choices to reduce PM emissions within an established PM Regulated Area (reference map insert).

The Arizona Legislature has defined a BMP for the PM Nonattainment Area (reference map insert) in A.R.S. 49-457(P)(3), as a technique verified by scientific research that, is practical, economically feasible and effective in reducing PM on a case by case basis from a regulated agricultural activity. The following section summarizes the BMPs approved by the Governor's Agricultural Best Management Practices Committee to reduce PM for each of the four commercial animal operations: dairy, beef cattle, poultry, and swine. A wide range of variation exists within each commercial animal operation within the PM Regulated Area (reference map insert) which can only be addressed by a wide range of flexible and adaptable management practices. Most methods for controlling PM and dust emissions parallel the controls for wind erosion. These methods are based on principles that contain or slow soil movement from fields. The BMPs are not designed to eliminate dust emissions 100 percent, but are expected to reduce wind erosion and associated PM. Not all of the BMPs will work equally well on every commercial animal operation because of variations in wind, soils, moisture conditions and, in some cases, the management approaches of individual operators. Such factors should be considered by the individual operator to ensure he or she implements effective BMPs. This guide represents the first step in helping to reduce PM emissions from commercial animal operations located within a PM Regulated Area (reference map insert).

COMMERCIAL SWINE FACILITY

Any swine operation with more than 50 animal units for more than 30 consecutive days within the boundary of the Maricopa PM Nonattainment area and Maricopa County portion of Area A, a PM nonattainment area designated after June 1, 2009 as stated in A.R.S. § 49-457(P)(1)(f), or the Pinal County PM Nonattainment Area. One thousand pounds equals one animal unit.

Category I: Arenas, Corrals, and Pens (Housing)

Any area where animals are confined for the purpose of, but not limited to feeding, displaying, safety, racing, exercising, or husbandry.

Best Management Practices for Arenas, Corrals, and Pens (housing)

- Add moisture through ventilation systems
- Clean fans, louvers, and soffit inlets
- Control vegetation on building exteriors
- House in fully enclosed ventilated buildings
- Use a slatted floor system
- Use sloped concrete flooring
- Use no bedding

Add Moisture through Ventilation Systems

Rule Definition

“Add moisture through ventilation systems” means reducing PM emissions by using a ventilation system that is designed to allow stock to maintain their normal body temperature without difficulty while maintaining a minimum of 15 percent moisture in the air within the housing system to bind small particles to larger particles.

Purpose

The addition of moisture through ventilation systems reduces PM emissions by increasing the moisture level in the air and on surfaces, reducing PM emissions caused by air movement and animal/employee disturbance. Moisture will help accumulated solids from drying out and becoming airborne as PM if disturbed.

Suggestion for Implementation

Add moisture to the housing units by using a misting or ventilation system that will maintain moisture in the housing units. A minimum of 15 percent moisture in the air within the house must be maintained.

Clean Fans, Louvers, and Soffit Inlets



Rule Definition

“Clean fans, louvers, and soffit inlet” means reducing PM emissions by cleaning fans, louvers, and soffit inlets between transfers of animal groups, but in any case, at least every six months.

Purpose

Dust can accumulate on fans, louvers, and soffit inlets. Cleaning them between animal groups reduces PM that can break free into the air from the fans, louvers, and soffit inlets.

Suggestions for Implementation

Clean the fans, louvers, and soffit inlets when facility is empty between animal groups. Cleaning must be completed at least every six months. Implement a cleaning policy and procedures protocol stating when and how to clean the fans, louvers, and soffit inlets. Document when the cleaning was completed.

Control Vegetation on Building Exteriors

Rule Definition

“Control vegetation on building exteriors” means reducing PM by removing, cutting, or trimming vegetation that accumulates PM and restricts ventilation of the building, so as to leave approximately three feet between the vegetation and building.

Purpose

Vegetation around housing units can increase PM emissions by trapping dust then dispensing into the atmosphere as air moves across it. Controlling vegetation on building exteriors will prevent dust accumulation.

Suggestions for Implementation

Clear vegetation around the housing units approximately three feet between vegetation and the building.

Housed in Fully Enclosed Ventilated Building

Rule Definition

“Housed in fully enclosed ventilated building” means reducing PM emissions by utilizing fully enclosed buildings with sufficient ventilation.



Purpose

Swine can be raised outside with and without shade shelters and inside of fully enclosed temperature regulated housing units with ventilation. The disturbance of soil, bedding, and/or manure accumulation on surfaces of outdoor swine housing units, by air, animal, or employee movement, can be a source of PM emissions. PM emissions can be reduced through dust mitigation inside of fully enclosed buildings and around the housing units.

Suggestions for Implementation

House swine in fully enclosed ventilated buildings.

Use a Slatted Floor System



Rule Definition

“Slatted flooring” means reducing PM emissions by using flooring that is a slotted concrete or wire-mesh floor set above a liquid manure collection pit, which allows the excrement to fall through the flooring into the liquid pit below, which prevents solids build up. Slats four to eight inches wide with spacing of about one inch in between are recommended.

Purpose

Slatted or perforated flooring allows effluent from the animals to fall into manure pits below the floor, minimizing the build-up of solids within the enclosure.

Suggestions for Implementation

Install a slatted or perforated floor system above a manure collection pit. It is recommended that the slats be four to eight inches wide with spacing of one inch in-between.

Use Sloped Concrete Flooring

Rule Definition

“Sloped concrete flooring” means reducing PM emissions by pouring concrete with a minimum of .25 percent grade inside of the barns, which provides drainage and easier cleaning of floor areas.

Purpose

Sloped concrete flooring will reduce soil disturbance from animal movement and digging. Sloped concrete floors allows for the manure to run down to the bottom of pen for easier cleaning. Dried manure build-up may occur on flooring that is not sloped. The disturbance of the dried solids may result in PM emissions.

Suggestions for Implementation

Install sloped flooring with a minimum of .25 percent grade inside of the barn.

Use no Bedding

Rule Definition

“Use no bedding” means reducing PM emissions by not using bedding such as wood shaving, sawdust, peanut hulls, straw, or other organic material.

Purpose

Disturbing the build-up of dried solids results in PM emissions. The use of bedding results in PM emissions due to the disturbance and break down of bedding material as well as disturbance of solids accumulation within the bedding material. PM emissions from bedding material and solids accumulation are prevented by not using bedding material.

Suggestions for Implementation

Remove all bedding material from the pens and stalls.



Category II: Animal Waste (and Feed) Handling and Transporting

Any activity that includes feeding animals, handling waste, and transporting or removing manure.

Best Management Practices for Animal Waste (and Feed) Handling and Transporting

- Add oil and/or moisture to feed
- Clean aisles between pens and stalls
- Clean pens, floors, and walls
- Enclose transfer points
- Maintain liquid lagoon level
- Maintain moisture in manure solids
- Minimize drop distance
- Remove spilled feed
- Stack separated manure solids
- Store feed
- Store separated manure solids in a wind-blocked area
- Use enclosed feed distribution system
- Use flexible discharge spout

Add Oil and/or Moisture to Feed

Rule Definition

“Add oil and/or moisture to the feed” means reducing PM emissions by adding a minimum of .5 percent edible oil and/or moisture to feed rations to bind small particles to larger particles.

Purpose

Addition of water and/or oils to feed rations can reduce PM emissions by binding the small particles to the larger ones in the ration.

Suggestions for Implementation

Add a minimum of .5 percent edible oil and/or moisture to the feed rations.

Clean Aisles between Pen and Stalls

Rule Definition

“Clean aisles between pens and stalls” means reducing PM emissions by cleaning the aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation.

Purpose

When disturbed by animals or employees, dried manure, spilled feed, and accumulated debris can contribute to PM emissions. Cleaning aisles between pens and stalls prevent dried manure, spilled feed, and debris accumulation.

Suggestions for Implementation

Clean aisles between pens and stalls at least twice every 14 days to prevent dried manure, spilled feed, and debris accumulation. Implement a cleaning policy and procedures protocol outlining when and how to clean aisles between pens and stalls. Document when the cleaning was completed.

Clean Pens, Floors, and Walls

Rule Definition

“Clean pens, floors, and walls” means reducing PM emissions by cleaning pens, floors, and walls between transfer of animal groups to prevent dried manure, spilled feed, and debris accumulation, but in any case, at least every six months.

Purpose

When disturbed by animals or employees, dried manure, spilled feed, and accumulated debris can contribute to PM emissions. Cleaning pens, floors, and walls between animal groups will prevent dried manure, spilled feed, and debris accumulation.

Suggestions for Implementation

Create a cleaning schedule for cleaning pens, floors, and walls to help prevent dried manure, spilled feed, and debris accumulation. Cleaning should be completed at least every six months. Implement a cleaning policy and procedures protocol outlining when and how to clean pens, floors, and walls. Document when the cleaning was completed.

Enclosed Transfer Points

Rule Definition

“Enclosed transfer points” means reducing PM emissions by enclosing the points of transfer between the enclosed, weatherproof storage structure and the enclosed feed distribution system, which reduces air contact with the feed rations, during feed conveyance.

Purpose

PM emissions in animal feeding operations can originate from feed and feed transfer. Emissions can be reduced through enclosing transfer points from the bulk feed storage structure to the in-house feed distribution system.

Suggestions for Implementation

Enclose all transfer points along the feed storage and distribution system to minimize emissions from feed and feed transfer.



Maintain Liquid Lagoon Level

Rule Definition

“Maintain liquid lagoon level” means reducing PM emissions by keeping the liquid level above the level of solids accumulation in the lagoon.



Purpose

Keeping the liquid levels above the solids in the lagoon will help maintain moisture levels in the solids and minimize the amount of PM emissions.

Suggestions for Implementation

Maintain moisture levels in the lagoon to ensure that the liquid level is above the solids accumulation in the lagoon.

Maintain Moisture in Manure Solids

Rule Definition

“Maintain moisture in manure solids” means reducing PM emissions by maintaining a moisture content of a minimum of 10 percent in the solids sufficient to bind small particles to larger particles.

Purpose

Maintaining moisture in manure solids can reduce PM emissions by binding the small particles to the larger particles.

Suggestions for Implementation

Moisture in manure solids must be monitored to ensure the moisture level maintained binds small particles to larger particles. Maintain moisture content of manure solids to a minimum of 10 percent.

Minimize Drop Distance

Rule Definition

“Minimize drop distance” means reducing PM emissions by designing the feed distribution system so that the distance the feed ration drops from the feed distribution system into feeders is 3 feet or less, which reduces air contact with the feed rations during feed conveyance.

Purpose

PM emissions in animal feeding operations can originate from feed and feed transfer. Emissions can be reduced by minimizing drop distance from the feed distribution system into feeders.

Suggestions for Implementation

Adjust the drop distance from the feed distribution system to the feeders to 3 feet or less.

Remove Spilled Feed

Rule Definition

“Remove spilled feed” means reducing PM emissions by removing spilled feed from the housing facility at least once every 14 days.

Purpose

When disturbed by animals or employees spilled feed can contribute to PM emissions. Removing spilled feed from the housing facility will reduce PM emissions.

Suggestions for Implementation

Remove spilled feed at least once every 14 days will prevent PM emissions from spilled feed. Implement a policy and procedures protocol outlining the cleaning of spilled feed. Document when the cleaning was completed.

Stack Separated Manure Solids



Rule Definition

“Stack separated manure solids” means reducing PM emissions and wind erosion by reducing the amount of exposed surface area of manure solids.

Purpose

PM emissions can originate from separated manure solids. Stacking separated solids to minimize surface area exposure, minimizing wind exposure can reduce PM emissions. Maintaining moisture in the solids can also reduce PM emissions by binding the small particles to the larger particles.

Suggestions for Implementation

Stack separated manure solids to minimize the surface area exposed to wind. Maintain the moisture level in the stacks, which will allow the small particles to bind to the larger particles.

Store Feed

Rule Definition

“Store feed” means reducing PM emissions by storing feed in a structure that is enclosed and weatherproof, which reduces air contact with the feed rations during feed storage.

Purpose

Storing feed in weatherproof structures keeps the feed out of contact from the air and wind.

Suggestions for Implementation

Store feed in a weatherproof, wind protected structure so that the bulk feed is not disturbed by the wind.

Store Separated Manure Solids in a Wind-blocked Area

Rule Definition

“Store separated manure solids in a wind-blocked area” means reducing PM by storing manure solids in a wind-blocked area behind a wall, structure, or area with natural wind protection to minimize blowing air movement over the manure stack.

Purpose



PM emissions can originate from separated manure solids. Storing manure behind a wall, structure, or area with wind protection will protect the manure from wind exposure.

Suggestions for Implementation

A wind barrier such as trees, wall, or any other man made structure can be used to protect the manure from the wind. The barrier should be higher than the manure being stored behind it. The wind barrier should be aligned across the prevailing wind direction.

Use Enclosed Feed Distribution System

Rule Definition

“Use enclosed feed distribution system” means reducing PM emissions by using an enclosed feed conveyance system that distributes feed rations throughout the housing facility, which reduces air contact with the feed rations during feed conveyance.

Purpose

PM emissions in animal feeding operations can originate from feed to feed transfer. Emissions can be reduced through an enclosed in-house feed distribution system that reduces air contact with the feed rations.

Suggestions for Implementation

Feed swine with an enclosed in-house feed distribution system.

Use a Flexible Discharge Spout

Rule Definition

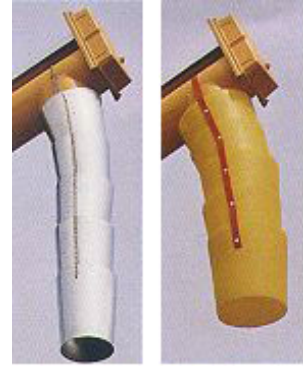
“Use a flexible discharge spout” means reducing PM emissions and wind erosion at the time of bulk feed deliveries to the housing units by using a flexible discharge spout on the end of the feed truck transfer auger.

Purpose

PM 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.

Suggestions for Implementation

Install a flexible discharge spout on the end of the feed truck transfer auger to protect the feed from the wind at the time of feed deliveries to the housing units.



CATEGORY III: Unpaved Access Connections

Any unpaved road connection which connects to a paved public road.

Best management practices for unpaved access connections

Install and maintain a track-out control system
Install signage to limit vehicle speed to 15 mph
Install speed control devices
Restrict traffic access

Install and Maintain Track-Out Control System

Rule Definition

“Track-out control system” means minimizing any and all material that adheres to and agglomerates on all vehicles and equipment from unpaved access connections and falls onto paved public roads or shoulders to paved public roads by using a device or system to remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road. Devices such as a grizzly, a gravel pad or a wheel wash system can be used.

Purpose

Track-out control devices/system remove mud or soil from a vehicle or equipment before the vehicle enters a paved public road, where the mud or soil can be crushed into fine particles and easily suspended in the air by passing vehicles.

Suggestions for Implementation

Install a suitable track-out control system that controls and prevents track-out and/or removes particulate matter from tires and the exterior surfaces of motor vehicles.

Some examples of track-out control systems are:

- Grizzly – a device similar to a cattle guard, which is used to dislodge mud, dirt, or debris from the tires and undercarriage of equipment and vehicles prior to leaving an unpaved access connection.
- Gravel pad – a pad of crushed stone, coarse gravel or recycled road base located at the point of intersection of a paved public roadway and an unpaved access connection.

It is recommended that:

- a) The stone or gravel is one inch or larger in diameter.
 - b) The gravel pad is applied a minimum of four inches deep.
 - c) The gravel pad is the full width of the entrance.
 - d) The gravel pad is a minimum of 50 feet long.
- Pavement – an area of asphalt, concrete or similar material applied to a farm road at the intersection of a paved public roadway and an unpaved access connection.

It is recommended that:

- a) The pavement is the width of the farm road.
- b) The pavement is a minimum of 100 feet long from the point of intersection with a paved public roadway.



Install Signage to Limit Vehicle Speed to 15 MPH

Rule Definition

“Install signage to limit vehicle speed” means reducing PM emissions and soil erosion from the operation of farm vehicles or equipment on unpaved access connections at speeds not to exceed 15 mph. This can be achieved through installation of signage.

Purpose

Limiting speeds to 15 mph can decrease the amount of PM emissions generated by vehicles or equipment driving over unpaved access connections and can decrease the amount of mud and oil tracked out onto a paved road.

Suggestions for Implementation

Examples of methods to reduce vehicle speed include, but are not limited to:

- Posting speed limit signs within 100 feet of a paved public road.
- Placing signs in all farm vehicles stating the speed limits on farm roads.

Install Speed Control Devices

Rule Definition

“Install speed control devices” means reducing PM emissions and soil erosion from the operation of farm vehicles or equipment on unpaved access connections by installing devices to control vehicle speeds.

Purpose

Speed control devices lower vehicular speed and help decrease the amount of PM generated by vehicles or equipment from getting onto paved public roads from unpaved access connections.

Suggestions for Implementation

Install speed control devices (e.g. speed bumps) within 100 feet of a paved public road.

Restrict Traffic Access



Rule Definition

“Access restriction” means reducing PM emissions by reducing the number of trips driven on agricultural aprons and access roads by restricting or eliminating public access to unpaved access connections with signs or physical obstruction at locations that effectively control access to the area.

Purpose

Restricting access helps reduce vehicular traffic on agricultural aprons and access roads by restricting or eliminating public access to unpaved access connections. Reducing the number of trips driven on agricultural aprons and access roads can reduce the amount of PM generated.

Suggestions for Implementation

- Installing physical barriers such as gates, fencing, posts, signs, shrubs, trees or other physical obstructions to prevent or control access to the area.
- Installing “no trespassing” or “limited use area” signs.

Category IV: Unpaved Roads or Feed Lanes

Roads and feed lanes that are unpaved, owned by a commercial animal operator, and used exclusively to service a commercial animal operation.

Best management practices for unpaved roads or feed

- Apply and maintain aggregate cover
- Apply and maintain oil on roads or feed lanes
- Apply and maintain synthetic particulate suppressant
- Apply and maintain water
- Install engine speed governors on feed trucks to 15 mph
- Install signage to limit vehicle speed to 15 mph
- Install speed control devices
- Restrict traffic access
- Wind barriers

Apply and Maintain Aggregate Cover

Rule Definition

“Aggregate cover” means reducing PM emissions, wind erosion and stabilizing soil by applying and maintaining gravel, concrete, recycled road base, caliche, or other similar material to unpaved roads or feed lanes. The aggregate should be clean, hard and durable, and should be applied and maintained to a minimum of 3 inches deep.



Purpose

Applying an aggregate cover to unpaved road and feed lane helps to reduce the generation of PM emissions by acting as a barrier to erosive forces like the wind or vehicle traffic.

Suggestions for Implementation

- The aggregate should be one inch or larger in diameter
- The aggregate should be applied a minimum of 3 inches deep.
- The aggregate material should be clean, hard and durable.

Apply and Maintain Oil on Roads or Feed Lanes

Rule Definition

“Apply and maintain oil on roads or feed lanes” means reducing PM by applying oils or organic PM suppressants to unpaved roads and feed lanes.

Purpose

Chemical stabilization changes the physical characteristics of the surface. For example, road oil forms a coat over PM forming a hard crust and also improves the cohesive resistance of road material.

Suggestions for Implementation

Oils may be applied once every two to three months and re-applied several times per year to maintain its efficiency. Applying oils 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.

Apply and Maintain Synthetic Particulate Suppressants

Rule Definition

“Synthetic particulate suppressant” means reducing PM emissions and wind erosion by providing a stabilized soil surface on a commercial swine operation with a manufactured product such as lignosulfate, calcium chloride, magnesium chloride, an emulsion of petroleum product, an enzyme product, or polyacrylamide that is used to control particulate matter.

Purpose

Synthetic particulate suppressants provide a surface barrier or binds soil particles together to hinder the generation of PM emissions on unprotected areas, such as unpaved roads or feed lanes.

Suggestions for Implementation

Applying nontoxic chemical or organic PM suppressants on unpaved roads or feed lanes can reduce PM emissions when vehicles pass over the unpaved surface.

Examples of synthetic particulate suppressant include, but are not limited to:

- Calcium Chloride (CaCl)
- Soybean feedstock (SBF) processing byproducts
- Calcium Lignosulfonate (lignin)
- Polyvinyl acrylic polymer emulsion (PVA)
- Polyacrymide (PAM)
- Emulsified petroleum resin

Differences in traffic type and volume, soil types, roadway surface characteristics and topography between sites requiring dust control can cause product performance to vary. Consult the NRCS office or a dust control contractor for specific recommendations. All products should be applied strictly in accordance with manufacturers’ specifications. 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.



Apply and Maintain Water as a Dust Suppressant



Rule Definition

“Apply water” means reducing PM emissions and wind erosion by applying water to unpaved roads and feed lanes during a period of high traffic until the surfaces are visibly moist.

Purpose

Applying water from a truck, tractor or other portable spray system to bare soil surfaces can help reduce PM emissions. Watering helps compact soil so that it is not dispersed into the air as vehicles travel over the soil surface.

Suggestions for Implementation

Watering is effective during peak usage times. Apply water so that the surface is visibly moist.

Install Engine Speed Governors on Feed Truck to 15 MPH

Rule Definition

“Install engine speed governors” means reducing PM emissions and soil erosion from the operation of feed trucks on unpaved roads or feed lanes at speeds not to exceed 15 mph through the installation of engine speed governors.

Purpose

Speed governors restrict vehicles to a specified speed and can help reduce PM emissions by lowering the speed at which vehicles travel on unpaved roads or feed lanes.

Suggestions for Implementation

Install speed governors on feed trucks to limit travel speeds to a maximum of 15 mph.

Install Signage to Limit Vehicle Speed to 15 MPH

Rule Definition

“Install signage to limit vehicle speed” means reducing PM emissions and soil erosion from the operation of farm vehicles or equipment on unpaved roads or feed lanes at speeds not to exceed 15 mph. This can be achieved through installation of signage.

Purpose

Speed limit signs inform drivers and equipment operators of established speed limits and help reduce PM emissions generated on unpaved roads or feed lanes by vehicles or equipment by lowering traffic speed.

Suggestions for Implementation

Examples of methods to reduce vehicle speed include, but are not limited to:

- Install 15 mph speed limit signs on unpaved roads and feed lanes.
- Placing signs in all farm vehicles stating the speed limits on farm roads.



Install Speed Control Devices

Rule Definition

“Install speed control devices” means reducing PM emissions and soil erosion from the operation of farm vehicles or equipment on unpaved roads or feed lanes by installing devices to control vehicle speeds.

Purpose

Speed control devices create a physical obstruction that requires drivers and equipment operators to lower their speed, which helps reduce PM emission generated by vehicles or equipment.

Suggestions for Implementation

Install speed control devices on unpaved roads and equipment areas to limit vehicle speeds.

Restrict Traffic Access

Rule Definition

“Access restriction” means reducing PM emissions by reducing the number of trips driven on unpaved roads and feed lanes by restricting or eliminating public access to unpaved roads and feed lanes with signs or physical obstruction at locations that effectively control access to the area.

Purpose

Restricting access helps reduce vehicular traffic on agricultural aprons and access roads by restricting or eliminating public access to unpaved roads and feed lanes. Reducing the number of trips driven on unpaved roads and feed lanes can reduce the amount of PM generated.

Suggestions for Implementation

- Installing physical barriers such as gates, fencing, posts, signs, shrubs, trees or other physical obstructions to prevent or control access to the area.
- Installing “no trespassing” or “limited use area” signs.

Wind Barrier

Rule Definition

“Wind Barrier” means reducing PM emissions and wind erosion by constructing a fence or structure, or providing a woody vegetative barrier by planting a row of trees or shrubs, perpendicular or across the prevailing wind direction to reduce wind speed by changing the pattern of air flow over the land surface. For fences and structures, the wind barrier shall have a density of no less than 50 percent and the height of the wind barrier must be proportionate to the downwind protected area. The downwind protected area is considered ten times the height of the wind barrier. For vegetative barriers, compliance shall be determined by NRCS Conservation Practice standard, Code 380, Windbreak/Shelterbelt Establishment, amended through August 21, 2009 (and no future editions).

Purpose

Wind barriers disrupt the erosive flow of wind over unpaved roads and feed lanes thus helping to reduce PM

Suggestions for Implementation

- Continuous board fences, burlap fences, crate walls, bales of hay and similar material can be used to control air currents and blowing soil.
- Barriers should be aligned across the prevailing wind direction. While 90 degrees or perpendicular is preferred, benefits can still be realized when barriers are aligned as close to perpendicular as possible.
- The distance of 10 times the barrier height is considered the protected area downwind of the barrier.



**20__ Agricultural Best Management Practices General Permit Record
Swine Operations – Serious PM10 Nonattainment Area**

Name of Commercial Swine Facility: _____ Phone: _____
 Name of Commercial Animal Operator: _____ Email: _____
 Mailing or Physical Address of Commercial Swine Facility: _____
 City: _____ State: _____ Zip: _____

Complete Form annually by March 31st and retain on facility. Provide Form within two business days of notice to the Arizona Department of Environmental Quality only when requested.

Refer to the *Guide to Agricultural PM10 Best Management Practices* for BMP information and definitions.

- | | |
|---|---|
| <p>CATEGORY I: Arenas, Corrals and Pens (Housing)
 Select at least two (2) of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> House in fully enclosed ventilated buildings <input type="checkbox"/> Use no bedding <input type="checkbox"/> Use a slatted floor system <input type="checkbox"/> Use sloped concrete flooring <input type="checkbox"/> Clean fans, louvers and soffit inlets in a commercial swine facility <input type="checkbox"/> Control vegetation on building exteriors <input type="checkbox"/> Add moisture through ventilation system | <p>CATEGORY II: Contined:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Minimize drop distance <input type="checkbox"/> Enclose transfer points <input type="checkbox"/> Clean pens, floors and walls in a commercial swine facility <input type="checkbox"/> Clean aisles between pens and stalls <input type="checkbox"/> Store separated manure solids in a wind blocked area <input type="checkbox"/> Stack separated manure solids <input type="checkbox"/> Maintain moisture in manure solids <input type="checkbox"/> Maintain liquid lagoon level |
| <p>CATEGORY II: Animal Waste (and Feed) Handling and Transporting
 Select at least two (2) of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Remove spilled feed <input type="checkbox"/> Store feed <input type="checkbox"/> Add oil and/or moisture to the feed <input type="checkbox"/> Use enclosed feed distribution system <input type="checkbox"/> Use flexible discharge spout | <p>CATEGORY III: Unpaved Access Connections
 Select at least two (2) of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Install speed control devices <input type="checkbox"/> Restrict traffic access <input type="checkbox"/> Install and maintain a track-out control system <input type="checkbox"/> Install signage to limit vehicle speed to 15 mph |
| | <p>CATEGORY IV: Unpaved Roads or Feed Lanes
 Select at least two (2) of the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Install engine speed governors on feed truck to 15 mph <input type="checkbox"/> Install signage to limit vehicle speed to 15 mph <input type="checkbox"/> Install speed control devices <input type="checkbox"/> Restrict traffic access <input type="checkbox"/> Apply and maintain aggregate cover <input type="checkbox"/> Apply and maintain synthetic particulate suppressant <input type="checkbox"/> Apply and maintain water <input type="checkbox"/> Apply and maintain oil on roads or feed lanes <input type="checkbox"/> Wind barrier |

Signature: _____ Date: _____

**20__ Agricultural Best Management Practices General Permit Record
Swine Operations – Pinal County**

Name of Commercial Swine Facility: _____ Phone: _____
 Name of Commercial Animal Operator: _____ Email: _____
 Mailing or Physical Address of Commercial Swine Facility: _____
 City: _____ State: _____ Zip: _____

Complete Form annually by March 31st and retain on facility. Provide Form within two business days of notice to the Arizona Department of Environmental Quality only when requested.

Refer to the *Guide to Agricultural PM10 Best Management Practices* for BMP information and definitions.

CATEGORY I: Arenas, Corrals and Pens (Housing)

Select at least one of the following:

- House in fully enclosed ventilated buildings
- Use no bedding
- Use a slatted floor system
- Use sloped concrete flooring
- Clean fans, louvers and soffit inlets in a commercial swine facility
- Control vegetation on building exteriors
- Add moisture through ventilation system

CATEGORY II: Animal Waste (and Feed) Handling and Transporting

Select at least one of the following:

- Remove spilled feed
- Store feed
- Add oil and/or moisture to the feed
- Use enclosed feed distribution system
- Use flexible discharge spout

- Minimize drop distance
- Enclose transfer points

Select at least one of the following:

- Clean pens, floors and walls in a commercial swine facility
- Clean aisles between pens and stalls
- Store separated manure solids in a wind blocked area
- Stack separated manure solids
- Maintain moisture in manure solids
- Maintain liquid lagoon level

CATEGORY III: Unpaved Access Connections

Select at least one of the following:

- Install speed control devices
- Restrict traffic access
- Install and maintain a track-out control system
- Install signage to limit vehicle speed to 15 mph

CATEGORY IV: Unpaved Roads or Feed Lanes

Select at least one of the following:

- Install engine speed governors on feed truck to 15 mph
- Install signage to limit vehicle speed to 15 mph
- Install speed control devices
- Restrict traffic access
- Apply and maintain aggregate cover
- Apply and maintain synthetic particulate suppressant
- Apply and maintain water lanes
- Apply and maintain oil on roads or feed lanes
- Wind barrier

Signature: _____ Date: _____

Where can I learn more?

If you do not know whether your agricultural operation resides within the PM Regulated Area, or if you have questions regarding compliance or specific components of the agricultural PM10 general permit, contact:

Arizona Department of Agriculture

Agricultural Consultation & Training
1688 W. Adams St.
Phoenix, AZ 85007
602-542-3484
800-294-0308
www.agriculture.az.gov

Arizona Cattlemen's Association

1401 N. 24th St.
Suite 4
Phoenix, AZ 85008
602-273-7414

Arizona Farm Bureau

325 S. Higley Rd.
Suite 210
Gilbert, AZ 85296
480-635-3614

Agua-Fria New River NRCD

16251 W. Glendale Ave.
Litchfield Park, AZ 85340
602-771-4162

Buckeye Valley NRCD

104 W. Baseline Rd.
Buckeye, AZ 85326
602-386-4631

Arizona Department of Environmental Quality

Air Quality Division
1110 W. Washington St.
Phoenix, AZ 85007
602-771-2300
800-234-5677
www.azdeq.gov/environ/air/index.html

East Maricopa NRCD/NRCS Field Office

805 E. Warner Rd.
Suite 104
Chandler, AZ 86225
480-988-1078

Maricopa County Cooperative Extension

4341 E. Broadway Rd.
Phoenix, AZ 85040
602-470-8086
www.cals.arizona.edu/maricopa/

NRCS/FSA Avondale Field Office

Maricopa County Farm Service Agency
12409 W. Indian School Rd.
Building B, Suite 201
Avondale, AZ 85323
623-535-5055

United Dairymen of Arizona

2008 S. Hardy Dr.
Tempe, AZ 85282
480-966-7211

Governor's Agricultural BMP Committee:

Dan Thelander (Committee Chair), Grain Producer, Chandler, Arizona
Wade Accomazzo, Alfalfa Producer, Tolleson, Arizona
Shane Burgess, Vice Provost and Dean, College of Agriculture and Life Sciences, University of Arizona, Tucson, Arizona
(Designee Jeff Silvertooth, Associate Dean, College of Agriculture and Life Sciences, University of Arizona)
Don Butler, Director, Arizona Department of Agriculture, Phoenix, Arizona
(Designee Brett Cameron, Assistant Director, Agricultural Consultation and Training, Arizona Department of Agriculture, Phoenix, Arizona)
Glen Curtis, Citrus Producer, Yuma, Arizona
Henry Darwin, Director, Arizona Department of Environmental Quality, Phoenix, Arizona
(Designee Eric Massey, Director, Air Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona)
Glenn Hickman, Poultry Operations, Buckeye, Arizona
Earl Petznick Jr., Beef Cattle Feedlot Operations, Maricopa, Arizona
Kevin G. Rogers, Cotton Producer, Mesa, Arizona
Will Rousseau, Vegetable Producer, Litchfield Park, Arizona
Marguerite Tan, Swine Operations, Snowflake, Arizona
Keisha Tatem, State Conservationist, Natural Resource Conservation Service, Phoenix, Arizona
Tom Thompson, Dairy Operations, Buckeye, Arizona
James L. Walworth, Soil Scientist, College of Agriculture and Life Sciences, University of Arizona, Tucson, Arizona
(Nominee) Michael Sundblom, Director, Pinal County Air Quality Control District, Florence, Arizona

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Dan Thelander (Co-Chair), Grain Producer, Maricopa, Arizona
Bas Aja, Arizona Cattlemen's Association, Phoenix, Arizona
Mike Billote, United Dairymen of Arizona, Tempe, Arizona
Brett Cameron, Arizona Department of Agriculture, Phoenix, Arizona
Jeannette Fish, Maricopa County Farm Bureau, Phoenix, Arizona
Cheryl Goar, Arizona Nursery Association, Phoenix, Arizona
Ana Kennedy, Arizona Farm Bureau Federation, Gilbert, Arizona
Rick Lavis, Arizona Cotton Growers Association, Phoenix, Arizona
Paco Ollerton, Cotton Producer, Casa Grande, Arizona
Earl Petznick Jr., Beef Cattle Feedlot Operations, Maricopa, Arizona
Jeff Sandquist, Veridus LLC, United Dairymen of Arizona, Phoenix, Arizona
Robert L. Shuler, The Shuler Law Firm PLC, Scottsdale, Arizona
Joe Sigg, Arizona Farm Bureau Federation, Gilbert, Arizona
Nick Simonetta, Pivotal Policy Consulting, Phoenix, Arizona
Chris Udall, Arizona Agribusiness and Water Council, Mesa, Arizona
Russell Van Leuven, Arizona Department of Agriculture, Phoenix, Arizona
Greg Wuertz, Cotton Producer, Casa Grande, Arizona

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Lisa Tomczak, Environmental Program Specialist, Air Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona

Emily Bonanni, Compliance Officer, Air Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona

Michael Smith, Compliance Officer, Air Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona

Stakeholders and Collaborating Partners

Arizona Agribusiness and Water Council
Arizona Cattle Feeders Association
Arizona Cotton Growers Association
Arizona Department of Agriculture
Arizona Department of Environmental Quality
Arizona Farm Bureau Federation
Arizona Nursery Association
Maricopa Association of Governments
Maricopa County Air Quality Department
Maricopa County Farm Bureau
Natural Resource Conservation Districts
United Dairymen of Arizona
University of Arizona - College of Agriculture and Life Sciences
University of Arizona - Cooperative Extension, Maricopa County
US Environmental Protection Agency Region IX
USDA Agricultural Research Service
USDA Natural Resources Conservation Service
Western Growers Association

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