

Guide to Agricultural PM10 Best Management Practices

“Agriculture Improving Air Quality”

Animal Operations – Beef Cattle Feedlot



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

First Edition, 2015

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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?

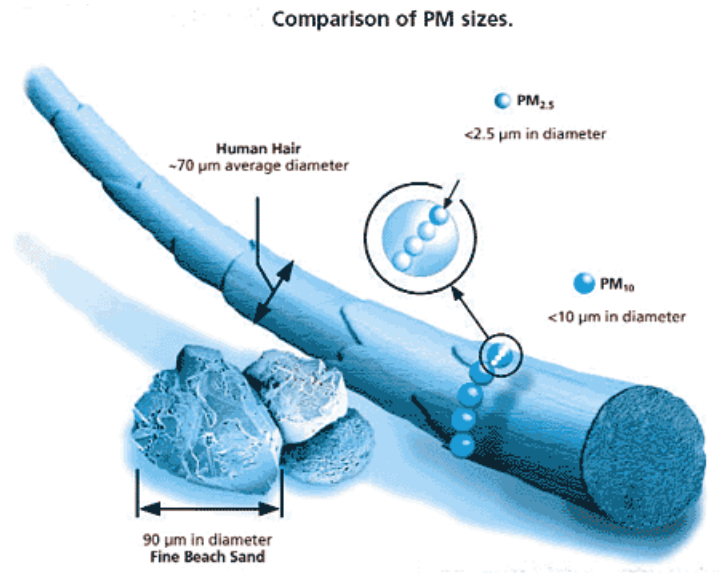
If the ADEQ Director determined that a commercial animal operator is not in compliance with the agricultural PM General Permit, the following three-stage process would occur as per A.R.S. 49-457(I)(J)(K):

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 meter 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 BEEF CATTLE FEEDLOT

Any beef cattle feedlot with more than 500 beef cattle 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.

Category I: Arenas, Corrals, and Pens

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

Add moisture to pen surface

- **Commercial feedlots in the Pinal County PM Nonattainment Area must also implement this BMP on the day that is forecast to be high risk for dust generation.**

Apply a fibrous layer

Concrete aprons

Control cattle during movements

Feed higher moisture feed to beef cattle

Frequent manure removal

Pile manure between cleanings

Provide shade in corral

Use drag equipment to maintain pens

Wind barrier

Add Moisture to Pen Surface

Rule Definition

“Add Moisture to Pen Surface” means reducing PM emission and wind erosion by applying at least three to six gallons of water per head/per day in pens occupied by beef cattle.

Purpose

The top layer of an open pen or corral becomes dusty as the surface dries out. The dust particles become suspended as animals move to the feed bunk, drink water, or other animal movements. By adding moisture to the pen surface it improves soil compaction and reduces the amount of PM emitted.

Suggestions for Implementation

Add moisture to pen surface by using a mobile sprinkler, fence line sprinkler, or installing other water devices.



Special Note: Commercial beef feedlots within the Pinal County PM Nonattainment Area, shall add water to pen surface on the day that a forecast to be high risk for dust generation by the Pinal County Dust Control Forecast.

Apply a Fibrous Layer

Rule Definition

“Apply a fibrous layer” means reducing PM emissions and soil movement, and preserving soil moisture by spreading shredded or deconstructed plant materials to cover loose soil in high animal traffic areas. Material shall be consistently applied to a minimum depth of two inches above the soil surface and coverage should be a minimum of 70 percent.

Purpose

Applying a fibrous layer prevents disturbance of the dry and loose manure surface caused by animal movement.

Suggestions for Implementation

Apply fibrous layers in areas with a high volume of animal traffic. Fibrous layers include wood chips, dry separated manure solids, or other materials to sorting alleys and high traffic areas. Another example is to put damp manure solids right off the separator into pens on a daily basis and working it with a harrow to keep fibrous materials at the surface and the finer below, trapping the finer particles.

Concrete Aprons

Rule Definition

“Concrete aprons” means reducing PM emissions by using solidly formed concrete surface, at least 4 inches thick on top of soil surface, inside the feed pen for 8 feet approaching the feed bunk or water trough.



Purpose

PM emissions result from the disturbance of dry and loose surface soil created by animal movements. Concrete provides permanent protection between the soil and the cattle during movement to feed bunk and water trough.

Suggestions for Implementation

Install concrete aprons inside the feed pens and water trough.

Control Cattle during Movements

Rule Definition

“Control cattle during movements” means reducing PM emissions by suppressing the animal’s ability to run by driving them forward while intruding on their “flight zones” or restraining the animal’s movement.

Purpose

By installing practices to “slowdown” or control the cattle while moving down pen alleys during pen moves, shipping and receiving will reduce PM emissions. When handlers maintain awareness of these movements less emissions are generated.

Suggestions for Implementation

Have animal handlers control cattle slowly during routine movements.

Feed Higher Moisture Feed to Beef Cattle

Rule Definition

“Feed higher moisture feed to beef cattle” means reducing PM emissions by feeding beef cattle feed that contains at least 30 percent moisture.

Purpose

Feeding higher moisture feed to cattle increases the moisture content in the manure. Higher moisture levels in the manure layer helps bind PM particles so they do not become air borne as easily as dry manure.

Suggestions for Implementation

Feed higher moisture feed as appropriate to increase the moisture content of manure.

Frequent Manure Removal

Rule Definition

“Frequent manure removal” means reducing PM emissions and wind erosion by harvesting loose manure on top of the pen surface at least once every six months.



Purpose

Frequent manure removal prevents build-up of powdery dust from materials deposited in designated areas. It minimizes the amount of fugitive PM emissions caused by animal’s hoof action by maintaining minimal amount of dry dust on corral surface.

Suggestions for Implementation

Remove manure at least once every six months from the open corral or pen. Keep the surface firm and hard preferably less than one inch of dry manure. Keeping the dry manure depth less than one inch above the

ground, and therefore keeping the corral surface thin and well compacted reduces PM emissions.

Pile Manure between Cleanings

Rule Definition

“Pile manure between cleanings” means reducing PM emissions by collecting loose manure surface materials, by scraping or pushing, within the confines of the surface area of the occupied feed pen at least four times per year.

Purpose

Piling manure helps reduce the surface area of manure that is exposed to wind erosion and also helps reduce the redistribution of un-compacted manure by animal activity. Minimizing the depth of the un-compacted manure layer can help reduce PM emissions.

Suggestions for Implementation

The management objective for open corral surfaces is to maintain a firm, well drained surface consisting of a one to three inch layer of well compacted manure and soil, minimizing the depth of un-compacted manure on the corral surface. Between manure removal operations, pile manure in corral areas with low animal traffic.

Provide Shade in Corral

Rule Definition

“Provide shade in corral” means reducing PM emissions by increasing stocking density and reducing animal movement by using a permanent structure, which provides at least 16 square feet per animal of shaded pen surface.

Purpose

Animals naturally congregate in the shaded, cooler areas of corrals, which increases the stocking density in those areas and the animals spend less time in the corral where they can generate PM emissions.

Increasing the stock density also increases the moisture content of the corral surface.

Suggestion for Implementation

Construct permanent shade structures in corrals that provide a minimum of 16 square feet of shade per animal.



Use Drag Equipment to Maintain Pens

Rule Definition

“Use drag equipment to maintain pens” means reducing PM emissions by using manure equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions.



Purpose

Drag or pull type equipment stabilizes soil surface by avoiding floor depressions and the accumulation of dry, un-compacted material in those depressions.

Suggestions for Implementation

Use drag equipment (e.g.: box scraper) instead of push equipment to maintain corrals.

Wind Barrier

Rule Definition

“Wind Barrier” means reducing PM emissions and wind erosion by construct 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 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 unprotected cropland fields 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.



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 molasses or tallow to feed
- Bulk materials
- Cover manure hauling trucks
- Do not load manure when wind exceed 15 mph
- Feed higher moisture feed to beef cattle
- Store and maintain feed stock
- Use drag equipment to maintain pens

Add Molasses or Tallow to Feed

Rule Definition

“Add molasses or tallow to feed” means reducing PM emissions by adding molasses or tallow so that it equals three percent of the total ration.

Purpose

Adding molasses or tallow to beef cattle increases the moisture content in manure. Higher moisture levels in the manure binds PM particles together so they do not become air borne as easily as dry manure.

Suggestions for Implementation

Add molasses or tallow to feed ration.

Bulk Materials

Rule Definition

“Bulk materials” means reducing PM by using a closed conveyor system instead of vehicular means to move grain or other feedstuffs.

Purpose

Uncovered or unprotected bulk materials can become a source of windblown dust. Bulk material controls involves minimizing visible entrained PM emissions from bulk materials by utilizing a closed conveyor system to mix or transport grain or other feed.

Suggestions for Implementation

Utilize a closed conveyor system to transport grain or mix other feed instead of a vehicular means.



Cover Manure Hauling Trucks

Rule Definition

“Cover manure hauling trucks” means reducing PM emissions by completely covering the top of the loaded area.

Purpose

Animal waste handling activities periodically require large amounts of dry manure to be removed from the animal pens and transported to sites where they are used as fertilizer for agricultural crops. Covering the top of manure hauling trucks during transit can reduce PM emissions.



Suggestions for Implementation

Cover cargo compartment of manure hauling trucks with a tarp or other suitable closure.

Do Not Load Manure Trucks with Dry Manure When Wind Exceeds 15 MPH

Rule Definition

Limit dry manure loading operations to days when wind speed is less than 15 mph.



Purpose

Animal waste handling activities periodically require large amounts of dry manure to be removed from the animal pens and transported to sites where they are used as fertilizer for agricultural crops. Limiting dry manure loading to days where the wind speed is less than 15 mph can reduce PM emissions by limiting contact of the manure to wind.

Suggestions for Implementation

Limit manure loading operation to days where wind speed is less than 15 mph. The facility should have an anemometer, a device that measures wind speeds.

Feed Higher Moisture Feeds to Beef Cattle

Rule Definition

“Feed higher moisture feed to beef cattle” means reducing PM emissions by feeding beef cattle feed that contains at least 30 percent moisture

Purpose

Feeding higher moisture feed to beef cattle increases the moisture content in manure. Higher moisture levels in the manure binds PM particles together so they do not become air borne as easily as dry manure.

Suggestions for Implementation

Add high moisture feeds to the beef cattle feed ration.

Store and Maintain Feed Stock

Rule Definition

“Store and maintain feed stock” means reducing PM emissions and wind erosion by storing feed stock in a covered area where the commodity is surrounded on at least three sides by a structure.

Purpose

Adequately storing and maintaining feed stock can lower PM emissions by reducing contact of the feed to the wind.

Suggestions for Implementation

Store bulk feed inventories in bins, tanks, or commodity barns.



Use Drag Equipment to Maintain Pens

Rule Definition

“Use drag equipment to maintain pens” means reducing PM emissions by using manure equipment pulled behind a tractor instead of using push equipment, which avoids dust accumulation in floor depressions.

Purpose

Drag or pull type equipment stabilizes soil surface by avoiding floor depressions and the accumulation of dry, un-compacted material in those depressions.

Suggestions for Implementation

Use drag equipment (e.g.: box scraper) instead of push equipment to maintain corrals.



CATEGORY III: Unpaved Access Connections

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

Best management practices for unpaved access connections

- Apply and maintain aggregate cover
- Apply and maintain pavement in high traffic areas
- Apply and maintain synthetic particulate suppressant
- Apply and maintain water as a dust suppressant
- Install and maintain a track-out control device

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 access connections, 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 access connections 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 Pavement in High Traffic Areas

Rule Definition

“Apply and maintain pavement” means reducing PM emission, wind erosion and stabilizing soil by applying and maintaining pavement to unpaved access connections, roads, or feed lanes.

Purpose

Pavement provides permanent protection between the soil and vehicle/equipment and reduces the amount of PM emissions generated. Pavement can also help prevent the buildup of particulate matter on vehicles and equipment by eliminating or reducing contact with loose soil.

Suggestions for Implementation

Pave access connection.

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 beef feedlot 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 access connections.

Suggestions for Implementation

Applying nontoxic chemical or organic PM suppressants on unpaved access connections 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 access connections during a periods 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 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

The track-out device must be a suitable track-out control device 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.



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 pavement in high traffic areas
Apply and maintain synthetic particulate suppressant
Apply and maintain water as dust suppressant
Install engine speed governors on feed trucks to 15 mph
Install signage to limit vehicle speed to 15 mph
Install speed control devices
Restrict access to through traffic

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 access connections, 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 nontoxic chemicals or organic PM suppressants such as oils to unpaved roads and feed lanes.

Purpose

Chemical stabilization tries to change 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 can 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 Pavement in High Traffic Areas

Rule Definition

“Apply and maintain pavement” means reducing PM emission, wind erosion and stabilizing soil by applying and maintaining pavement to unpaved access connections, roads, or feed lanes.

Purpose

Pavement provides permanent protection between the soil and vehicle/equipment and reduces the amount of PM emissions generated. Pavement can also help prevent the buildup of particulate matter on vehicles and equipment by eliminating or reducing contact with loose soil.

Suggestions for Implementation

Pave unpaved roads and feed lanes.

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 beef feedlot 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 and feed lanes.

Suggestions for Implementation

Applying nontoxic chemical or organic PM suppressants on unpaved roads and 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 access roads and feed lanes during a periods 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 emission and soil erosion from the operation of farm vehicles or farm equipment on unpaved farm roads or feed lanes at speeds not to exceed 15 mph. This can be achieved through 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 tamper proof speed governors on vehicles used on the farm 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, equipment activity areas, 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 to 15 mph.

Restrict Access to Through Traffic



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 roads and feed lanes with signs or physical obstruction at location 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 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.

**20 Agricultural Best Management Practices General Permit Record
Beef Feedlot Operations – Serious PM10 Nonattainment Area**

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

A commercial farmer must select and implement at least TWO practices from each category.
 Refer to Arizona Administrative Code R18-2-611 for BMP information and definitions.

- | | |
|--|---|
| <p>CATEGORY I: Arenas, Corrals and Pens</p> <ul style="list-style-type: none"> <input type="checkbox"/> Concrete aprons <input type="checkbox"/> Provide shade in corral <input type="checkbox"/> Add water to pen surfaces <input type="checkbox"/> Manure removal <input type="checkbox"/> Pile manure between cleanings <input type="checkbox"/> Feed higher moisture feed to beef cattle <input type="checkbox"/> Control cattle during movements <input type="checkbox"/> Use drag equipment to maintain pens <input type="checkbox"/> Apply a fibrous layer <input type="checkbox"/> Wind barrier | <p>CATEGORY II: Animal Waste Handling, Feed Activities and Transporting</p> <ul style="list-style-type: none"> <input type="checkbox"/> Feed higher moisture feed to beef cattle <input type="checkbox"/> Add molasses or tallow to feed <input type="checkbox"/> Store and maintain feed stock <input type="checkbox"/> Bulk materials <input type="checkbox"/> Use drag equipment to maintain pens <input type="checkbox"/> Cover manure hauling trucks <input type="checkbox"/> Do not load manure when wind exceeds 15 mph |
| <p>CATEGORY III: Unpaved Access Connections</p> <ul style="list-style-type: none"> <input type="checkbox"/> Install and maintain a track-out control device <input type="checkbox"/> Apply and maintain pavement in high traffic areas <input type="checkbox"/> Apply and maintain aggregate cover <input type="checkbox"/> Apply and maintain synthetic particulate suppressant <input type="checkbox"/> Apply and maintain water as a dust suppressant | <p>CATEGORY IV: Unpaved Roads or Feed Lanes</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 access to through traffic <input type="checkbox"/> Apply and maintain pavement in high traffic areas <input type="checkbox"/> Apply and maintain aggregate cover <input type="checkbox"/> Apply and maintain synthetic particulate suppressant <input type="checkbox"/> Apply and maintain water as a dust suppressant <input type="checkbox"/> Apply and maintain oil on roads or feed lanes |

Signature: _____ Date: _____

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

**20 ___ Agricultural Best Management Practices General Permit Record
Feedlot Operations – Pinal County**

Name of Commercial Feedlot Facility: _____ Phone: _____
 Name of Commercial Animal Operator: _____ Email: _____
 Mailing or Physical Address of Commercial Feedlot 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.

Select Best Management Practices (BMP) as indicated by Category. (See High Risk Dust Generation Days section on back page for more information.)

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

CATEGORY I: Arenas, Corrals and Pens

Select at least one of the following:

- Concrete aprons
- Provide shade in corral
- Add water to pen surfaces
- Manure removal
- Pile manure between cleanings
- Feed higher moisture feed to beef cattle
- Control cattle during movements
- Use drag equipment to maintain pens
- Apply a fibrous layer
- Wind barrier

CATEGORY II: Animal Waste Handling and Transporting

Select at least one of the following:

- Feed higher moisture feed to beef cattle
- Add molasses or tallow to feed
- Store and maintain feed stock
- Bulk materials

- Use drag equipment to maintain pens
- Cover manure hauling trucks
- Do not load manure when wind exceeds 15 mph

CATEGORY III: Unpaved Access Connections

Select at least one of the following:

- Install and maintain a track-out control device
- Apply and maintain pavement in high traffic areas
- Apply and maintain aggregate cover
- Apply and maintain synthetic particulate suppressant
- Apply and maintain water as a dust suppressant

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 access to through traffic

- Apply and maintain pavement in high traffic areas
- Apply and maintain aggregate cover
- Apply and maintain synthetic particulate suppressant
- Apply and maintain water as a dust suppressant
- Apply and maintain oil on roads or feed lanes

High Risk Dust Generation Days BMP:

- Add water to pen surface on the day that is forecast to be high risk for dust generation by the Pinal County Dust Control Forecast.

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

Ag BMP Technical Work Group:

Kevin G. Rogers (Co-Chair), Cotton Producer, Mesa, Arizona
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

ADEQ Staff assigned to Governor's Ag BMP Committee:

Danielle M. Hazeltine, Rules Specialists, Air Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona

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