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Introduction

People who live and work in the South Coast Air Basin breathe unhealthful amounts of fine particulate matter (PM10). This Guide describes common-sense farming practices that reduce airborne PM10 dust. Following these practices exempts you from other dust control requirements of AQMD's Rule 403 (e.g., no visible dust over the property line). *AQMD Rules 403 and 1186 require PM10 dust control for all fugitive dust sources.*

Federal law requires that all sources of fugitive dust be controlled, including agriculture. To meet the law's requirements while minimizing its impact on agriculture, local farmers, Farm Bureaus, and agriculture agencies have worked with the AQMD to identify local farming-appropriate "best conservation practices" to reduce airborne PM10 dust. They have also developed a simple self-monitoring form, which minimizes your paperwork and eliminates fees. This Guide, a part of the group's outreach program, will help local farmers comply with AQMD's Rule 403 fugitive dust requirements.

Which Farmers Are Affected?

Beginning July 1, 1999, crop farmers on sites greater than 10 acres within the South Coast Air Basin (Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties) are subject to Rule 403. Following the agricultural dust control practices and keeping your self-monitoring form updated will exempt you from other Rule 403 provisions. **Small farming operations with under 10 acres of disturbed land, operations in the desert areas under AQMD jurisdiction (Coachella Valley), and livestock operations remain completely exempt from Rule 403. Coachella Valley farmers must continue to comply with Rule 403.1.**

Where Can I Learn More?

After reviewing this Guide and determining the best practices for your farm (using the self-monitoring form as a guide), you may still have questions, such as:

Does Rule 403 apply to me? What do I need to do to comply?

Contact Julia Lester (AQMD PM Program Supervisor), at (909) 396-3162 or jlester@aqmd.gov

What are the best conservation practices for my farm?

Contact your local Natural Resources Conservation Service (NRCS), Resource Conservation District (RCD), Cooperative Extension, or Farm Bureau representative. (*Phone numbers listed inside.*)

Background

What is PM10?

PM10 is small particulate matter less than 10 microns in size, which means it is smaller than an eighth of the size of a human hair. Particulates of this size penetrate deep into our lungs, causing a wide variety of harmful health effects, including an increase in respiratory infections, asthma attacks, and even mortality rates. Children, the elderly, and those with pre-existing respiratory and/or cardiovascular disease appear to be most susceptible. Dust can be up to 40% or more of the PM10 in the air. (About half of the dust emitted into the air is PM10.) Federal law requires the AQMD to control PM10 dust sources. PM10 also includes soot and particulates formed in the air from mobile and stationary sources, which are also regulated.

Why Regulate Agriculture?

The South Coast Air Basin, including Orange County and the non-desert portions of Los Angeles, San Bernardino, and Riverside counties, is a serious PM10 non-attainment area. Historically, agriculture was exempt from dust control requirements, but the federal Clean Air Act requires that PM10 dust from all sources in a serious non-attainment area be controlled. PM10 dust comes from a variety of sources, including road dust lofted by the passage of vehicles, construction, cement and aggregate plants, and agriculture (including tilling and wind-blown dust from fields). Agriculture contributes about 18% of the PM10 dust in the Basin, with the greatest contribution in San Bernardino and Riverside counties. Rule 403 and Rule 1186 seek reductions of PM10 dust emissions from all sources, including agriculture. Following the agricultural dust control practices helps ensure that the area complies with federal law and is not subject to further PM10 dust control regulations.

Where Can I Get Help?

Technical assistance with selecting, adopting, and implementing the conservation practices listed in this Handbook is available, free of charge, from your local Resource Conservation District (RCD), Natural Resources Conservation Service (NRCS), or Cooperative Extension office. Cost-sharing incentives to implement dust-reducing practices may also be available from these resource agencies.

NRCS/RCD Offices

Los Angeles, Urban Office
(213) 580-8890
Riverside/Orange County
(909) 684-1552
(909) 683-7691
Redlands
(909) 799-7407
San Jacinto
(909) 654-7733
(909) 654-7139
Apple Valley
(760) 242-2906

University of California Cooperative Extension
(909) 683-6491

In each Conservation Practice category, choose the practice(s) you will follow on your fields. Note your choices on the self-monitoring form (at back of this booklet).

Active Conservation Practices

Exempted: Orchards, vine crops, nurseries, range land, and irrigated pasture.
During active operations on your field, do at least one practice in addition to activity modification.

Activity Modification

Limit dusty work on windy days. The Rule 403 Agricultural Handbook specifies that tilling and soil preparation operations must cease when winds are over 25 mph. The Rule 403 Agricultural Handbook has special provisions for high wind conditions that extend more than two consecutive days.

Practices

1. Soil Moisture Monitoring

Ensure adequate soil moisture. Sufficient soil moisture will help bind the soils and will reduce dust. The Rule 403 Agricultural Handbook specifies that moisture must be adequate to ensure that visible dust emissions do not exceed 100 feet from any source.

An example of soil moisture monitoring.

2. Irrigation System

Irrigate or bed fields as soon as feasible. Studies have shown that a smooth, dry field without any vegetation is one of the largest potential sources of windblown dust. Irrigating or bedding fields as soon as feasible after land leveling or releveling will prevent this condition and will prevent excessive dust. The water wheel below is one of the many types of irrigation systems available.

An example of an irrigation system.

Active Conservation Practices
(Continued)

3. Minimum Tillage

Utilize conservation tillage practices. These photographs provide two examples of the many different farming practices considered "minimum tillage." Your local NRCS, RCD, and Cooperative Extension office can provide guidance on the various minimum tillage practices.

An example of minimum tillage.

Minimum tillage will leave residue on the surface, after planting.

4. Mulching

Applying mulch or other materials will help bind the soils. Uniformly distribute plant residues, manure, or other suitable materials not produced on the site to the soil surface prior to disturbing the soil.

An example of mulching.

In each Conservation Practice category, choose the practice(s) you will follow on your fields. Note your choices on the self-monitoring form (at back of this booklet).

Inactive Conservation Practices

Exempted: Orchards, vine crops, nurseries, range land, and irrigated pasture.
When your fields are not actively being worked, do at least 3 of the 9 practices.

1. Local Jurisdiction Ordinance

Many jurisdictions have local ordinances relating to agricultural operations, including Riverside county, San Bernardino county, Hemet, San Jacinto, Ontario, Fontana, Rancho Cucamonga and others.

Farmers relying on compliance with local dust ordinances must have adequate documentation showing how they are in compliance with that ordinance.

An example of cover crops.

2. Cover Crop

Ground cover will reduce wind erosion. Establish cover crops that maintain a minimum of 60 percent ground cover. After the vegetation dries up, the roots will help hold the soils in place. Native or volunteer vegetation that meets the minimum ground cover requirements is acceptable.

3. Crop Residue Management

Maintain crop residues from previous crops. Crop residues must maintain a minimum of 60 percent ground cover as determined by line-intersection method. Implements such as undercutters or sweeps can maintain crop residues without burying or destroying residues.

An example of crop residue management.

Inactive Conservation Practices
(Continued)

An example of surface roughening

4. Surface Roughening

Surface roughing can reduce ground wind speeds. Conduct surface roughening by bedding, rough disking, or tillage that leaves the surface covered by stable clods. Disc fallow fields to eliminate weeds before they mature seed and form beds before soils become too dry to work.

5. Minimum Tillage

Refer to section 1 (*Active Conservation Practices*), conservation practice 3 (*Minimum Tillage*).

6. Cross Wind Stripcropping

Alternate strips of row crops with wind-resistant crops. Stripcropping is most effective if strips are at right angles to the prevailing winds.

An example of cross wind stripcropping.

Inactive Conservation Practices
(Continued)

An example of a field wind break.

7. Field Windbreaks

Trees or shrubs adjacent to the upwind edge of a farm can reduce wind erosion. Windbreaks should be established at a right angle to the prevailing wind direction. Be careful to avoid conflicts with above and below ground utilities.

8. Ridge Roughness

Ridge planting can reduce ground wind speed. Establish ridges by normal tillage and planting equipment at a right angle to the prevailing wind direction. Ridges are to be maintained through wind erosive periods, or until crops are established to prevent wind erosion. Not appropriate for unstable soils such as sands or loamy sands.

9. Wind Barriers

Vegetative barriers within a field can reduce ground wind speed. Plant or maintain perennial or annual plants throughout a crop field at a right angle to the prevailing wind direction.

An example of ridge roughness.

An example of wind barriers.

In each Conservation Practice category, choose the practice(s) you will follow on your fields. Note your choices on the self-monitoring form (at back of this booklet).

Farm Yard Area Conservation Practices

Do at least one of the four, as applicable to your yard.

1. Vegetation

Revegetate to prevent wind erosion. Establish or maintain sufficient vegetation to prevent wind driven dust.

2. Dust Suppressants

Water or chemical dust suppressants will bind soils. Watering will require frequent applications and vendors can supply information on the best chemical dust suppressants for your situation.

3. Surface Modification

Surface improvements (i.e., concrete) can be a semi-permanent solution. Other materials (i.e., paving, recycled asphalt, or gravel to a depth of four inches) may be more cost-effective at some sites.

4. Disturbed Surface Area Reduction

Minimize the surface area disturbed. Reduce farm yard area by at least 50 percent from the original disturbed surface area. To qualify, the original disturbed surface area must be treated to prevent wind driven dust.

In each Conservation Practice category, choose the practice(s) you will follow on your fields. Note your choices on the self-monitoring form (at back of this booklet).

Track-Out Conservation Practices

Do at least one of three practices

1. Track-Out Area Improvements

Improve unpaved intersections with paved public roads. Pave or apply chemical dust suppressants to unpaved road connections with paved public roads. The most important section is the last 100 feet before intersecting with paved public roads.

An example of a track-out prevention device.

2. Track-Out Prevention

Prevent track-out! Installation of a track-out prevention device or other measures to prevent track-out can be more cost-effective than cleaning streets surrounding a farm. The California Vehicle Code also has requirements relating to track-out (CVC 23113 – Removing Material from the Highway and CVC 23114 – Spilling Loads on the Highway).

3. End of Row Equipment Turn Around Areas

Keep machinery off public roads. Prohibit turning tractors and other machinery on paved public roads if soil will be dropped on the road. If material is dropped on the road, clean the road once the activity has finished.

In each Conservation Practice category, choose the practice(s) you will follow on your fields. Note your choices on the self-monitoring form (at back of this booklet).

Unpaved Roads Conservation Practices

Do at least one of the four practices.

1. Speed Control

Reduce your speed. Vehicles pulverize unpaved surfaces and can be a very large source of dust. Unpaved road dust emissions are a function of speed so reducing your speed reduces dust. The Rule 403 Agricultural Handbook identifies a maximum unpaved road speed of 15 mph.

An example of access restriction.

2. Access Restriction

Restrict public access to private roads. Restricting access will reduce unpaved road traffic and will reduce dust. Access restrictions can be either through signage or physical obstructions.

3. Unpaved Road Treatments

Apply water, mulch, chemical dust suppressants or other materials to unpaved roads prior to heavy use periods. Treatments must be early enough so that mud will not be stuck to tires and carried out onto paved public roads.

4. Surface Modification

Improve heavily used roads. Improvement options include concrete, recycled road base or gravel. The Rule 403 Agricultural Handbook specifies that gravel must be maintained at a depth of at least four inches.

In each Conservation Practice category, choose the practice(s) you will follow on your fields. Note your choices on the self-monitoring form (at back of this booklet).

Storage Pile Conservation Practices

Do at least one of the four practices.

1. Wind Sheltering

Enclose fine material. The Rule 403 Agricultural Handbook specifies that enclosures must be in a three-sided barrier equal to the height of the material. Open side of the enclosure should be oriented to the downwind side of the material.

2. Watering

The Rule 403 Agricultural Handbook specifies that water must be applied at sufficient quantity and frequency to prevent wind driven fugitive dust.

3. Chemical Stabilization

The Rule 403 Agricultural Handbook specifies that approved chemical dust suppressants must be applied at sufficient quantity and frequency to prevent wind driven fugitive dust. Best for use on storage piles subject to infrequent disturbances.

4. Covering

Cover fine material. Tarps, plastic, or other materials can serve as temporary covers. Covers should be anchored to prevent wind from removing the cover.

Conservation Practice Self-Monitoring Form[1]

This is an example of a completed form. Use the blank form on the next page for your farm.

Farm Name: AAAA Farms

Producer Signature: John Smith

Date: 6/19/99

	Active[2]		Inactive[2]		Farm Yard Area		Track-Out		Unpaved Roads		Storage Piles
✓	Activity Modification **(Mandatory)**		*(minimum of three)*		*(minimum of one)*		*(minimum of one)*		*(minimum of one)*		*(minimum of one)*
	(minimum of one from below)	✓	Local Jurisdiction Ordinance		Vegetation	✓	Track-Out Area Improvements	✓	Speed Control		Wind Sheltering
	Soil Moisture		Cover Crop		Dust Suppressants		Track-Out Prevention		Access Restriction		Watering
✓	Irrigation System	✓	Crop Residue Management		Surface Area Modification		End of Row Turn Around Areas		Unpaved Road Treatments	✓	Chemical Stabilization
	Minimum Tillage		Surface Roughening	✓	Disturbed Surface Area Reduction		*Alternative Practices*		Surface Modification		Covering
	Mulching		Minimum Tillage		*Alternative Practices*		*Justification*		*Alternative Practices*		*Alternative Practices*
	Alternative Practices	✓	Cross Wind Stripcropping		*Justification*				*Justification*		*Justification*
	Justification		Field Windbreaks								
			Ridge Roughness								
			Wind Barriers								
			Alternative Practices								
			Justification								

[1] If you wish to choose different practices for different fields, separate sheets must be filled out for each site.
[2] The following operations are exempt from active and inactive land conservation practices: orchards, vine crops, nurseries, range land, and irrigated pasture.

If you wish, you may propose alternative conservation practices to comply with Rule 403. If you cannot apply the minimum required conservation practices and have no alternatives, you may be able to submit a technical justification statement. For more information, contact the AQMD at Rule 403 Compliance, SCAQMD, 21865 E. Copley Drive, Diamond Bar, CA 91765-4182 or e-mail us at mlaybourn@aqmd.gov.

Conservation Practice Self-Monitoring Form[1]

Copy as many of these forms as you need for your fields and/or farm areas.

Important: Maintain a copy of the completed form at your farm yard or office.

Farm Name _____

Producer Signature _____

Date _____

	Active[2]	Inactive[2]	Farm Yard Area	Track-Out	Unpaved Roads	Storage Piles
✓	Activity Modification (Mandatory)	*Minimum of three*	*Minimum of one*	*Minimum of one*	*Minimum of one*	*Minimum of one*
	Minimum of one from below	Local Jurisdiction Ordinance	Vegetation	Track-Out Area Improvements	Speed Control	Wind Sheltering
	Soil Moisture	Cover Crop	Dust Suppressants	Track-Out Prevention	Access Restriction	Watering
	Irrigation System	Crop Residue Management	Surface Area Modification	End of Row Turn Around Areas	Unpaved Road Treatments	Chemical Stabilization
	Minimum Tillage	Surface Roughening	Disturbed Surface Area Reduction	*Alternative Practices*	Surface Modification	Covering
	Mulching	Minimum Tillage	*Alternative Practices*	*Justification*	*Alternative Practices*	*Alternative Practices*
	Alternative Practices	Cross Wind Stripcropping	*Justification*		*Justification*	*Justification*
	Justification	Field Windbreaks				
		Ridge Roughness				
		Wind Barriers				
		Alternative Practices				
		Justification				

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Cut along the line.

Conservation Practice Self-Monitoring Form[1]

Copy as many of these forms as you need for your fields and/or farm areas.
Important: Maintain a copy of the completed form at your farm yard or office.

Farm Name: _____

Producer Signature: _____

Date: _____

	Active[2]	Inactive[2]	Farm Yard Area	Track-Out	Unpaved Roads	Storage Piles
✓	Activity Modification **(Mandatory)**	*(minimum of three)*	*(minimum of one)*	*(minimum of one)*	*(minimum of one)*	*(minimum of one)*
	(minimum of one from below)	Local Jurisdiction Ordinance	Vegetation	Track-Out Area Improvements	Speed Control	Wind Sheltering
	Soil Moisture	Cover Crop	Dust Suppressants	Track-Out Prevention	Access Restriction	Watering
	Irrigation System	Crop Residue Management	Surface Area Modification	End of Row Turn Around Areas	Unpaved Road Treatments	Chemical Stabilization
	Minimum Tillage	Surface Roughening	Disturbed Surface Area Reduction	*Alternative Practices*	Surface Modification	Covering
	Mulching	Minimum Tillage	*Alternative Practices*	*Justification*	*Alternative Practices*	*Alternative Practices*
	Alternative Practices	Cross Wind Stripcropping	*Justification*		*Justification*	*Justification*
	Justification	Field Windbreaks				
		Ridge Roughness				
		Wind Barriers				
		Alternative Practices				
		Justification				

[1] If you wish to choose different practices for different fields, separate sheets must be filled out for each site.
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