

## 6. CONTROL MEASURES AND MITIGATION DEVICES

A portion of Maricopa County was classified as a serious PM<sub>10</sub> nonattainment area after failing to meet the NAAQS by the Clean Air Act deadline of December 31, 1994. In response to this classification, and in an attempt to meet the standards by the new deadline of December 31, 2006, the county adopted Rule 310, most recently revised on February 16, 2000. This chapter contains a summary of Rule 310, followed by summaries of mitigation practices of other jurisdictions for comparison.

### MARICOPA COUNTY

#### Summary of Rule 310

Maricopa County Rule 310, Fugitive Dust Sources, is the cornerstone of the *Revised MAG 1999 Serious Area PM<sub>10</sub> Plan* submitted to EPA in February 2000. The plan contains 77 control measures and demonstrates attainment of the 24-hour and annual PM<sub>10</sub> standards by December 31, 2006. Eighty percent of the reductions in emissions required to attain the standards by 2006 are attributable to the strengthening and increased enforcement of Rule 310.

According to Rule 310, a dust control plan must be submitted for earthmoving operations that disturb one-tenth of an acre or more. Construction sites of at least five acres must also post a project information sign with the project name, the names and phone numbers of the individuals responsible for the project, and the phone number for the Maricopa County Environmental Services Department dust complaint line.<sup>[9]</sup>

The source type and control measures directly related to construction activities in Rule 310 are summarized in table 16. At least one dust control measure in each source type must be implemented if applicable to the earthmoving or construction project; a second measure must be selected as a contingency measure. Some measures are mandatory and these are noted in the table.

#### Maricopa County Flood Control District

During 1992, The Maricopa County FCD published a *Best Management Practices (BMP) and Erosion Control Manual* to assist agencies, engineers, and contractors in complying with the EPA regulations then in effect with respect to the discharge of stormwater from construction sites. At the time the document was published, the FCD stated their intent that its BMP provisions be adopted by the MAG and other agencies. This document is now referred to as the *Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control*.<sup>[10]</sup>

**TABLE 16. RULE 310 SOURCE TYPE AND CONTROL MEASURES  
DIRECTLY RELATED TO CONSTRUCTION ACTIVITIES**

<b>Source Type and Control Measures</b>
<b>Vehicle Use In Open Areas And Vacant Lots:</b>
1A Restrict trespass by installing signs.
2A Install physical barriers such as curbs, fences, gates, posts, signs, shrubs, and/or trees to prevent access to the area.
<b>Unpaved Parking Lots:</b>
1B Pave.
2B Apply and maintain gravel, recycled asphalt, or other suitable material, in compliance with subsection 302.1 of this rule.
3B Apply a suitable dust suppressant, in compliance with subsection 302.1 of this rule.
<b>Unpaved Haul/Access Roads:</b>
1C Limit vehicle speed to 15 miles per hour or less and limit vehicular trips to no more than 20 per day.*
2C Apply water, so that the surface is visibly moist and subsection 302.2 of this rule is met.*
3C Pave.*
4C Apply and maintain gravel, recycled asphalt, or other suitable material, in compliance with subsection 302.2 of this rule.*
5C Apply a suitable dust suppressant, in compliance with subsection 302.2 of this rule.*
<b>Disturbed Surface Areas:</b>
<b>Pre-Activity:</b>
1D Pre-water site to the depth of cuts.
2D Phase work to reduce the amount of disturbed surface areas at any one time.
<b>During Dust Generating Operations:</b>
3D Apply water or other suitable dust suppressant, in compliance with Section 301 of this rule.
4D Apply water as necessary to maintain a soil moisture content at a minimum of 12%, as Determined by ASTM Method D2216-98*** or other equivalent as approved by the control officer and the administrator of EPA. For areas which have an optimum moisture content for compaction of less than 12%, as determined by ASTM Method D1557***-91(1998) or other equivalent approved by the Control Officer and the Administrator of EPA, maintain at least 70% of the optimum soil moisture content.
5D Construct fences or 3 foot - 5 foot high wind barriers with 50% or less porosity adjacent to roadways or urban areas that reduce the amount of windblown material leaving a site. If constructing fences or wind barriers, must also implement 3D or 4D above.
<b>Temporary Stabilization During Weekends, After Work Hours, And On Holidays:</b>
6D Apply a suitable dust suppressant, in compliance with subsection 302.3 of this rule.
7D Establish vegetative ground cover in sufficient quantity, in compliance with subsection 302.3 of this rule.
8D Restrict vehicular access to the area, in addition to either of the control measures described in 6D and 7D above.

**TABLE 16. RULE 310 SOURCE TYPE AND CONTROL MEASURES  
DIRECTLY RELATED TO CONSTRUCTION ACTIVITIES (Continued)**

<b>Source Type and Control Measures</b>
<p><b>Bulk Material Hauling/Transporting:</b>  <b>When Onsite Hauling/Transporting Within The Boundaries Of The Work Site When Crossing A Public Roadway Upon Which The Public Is Allowed To Travel While Construction Is Underway:</b>                      1G Load all haul trucks such that the freeboard is not less than 3 inches when crossing a public roadway upon which the public is allowed to travel while construction is underway;* and                      2G Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s); and                      3G Install a suitable trackout control device that controls and prevents trackout and/or removes particulate matter from tires and the exterior surfaces of haul trucks and/or motor vehicles that traverse such work site. Examples of trackout control devices are described in Table 1 (Trackout 1J, 2J, 3J) of this rule; and</p> <p><b>When Onsite Hauling/Transporting Within The Boundaries Of The Work Site But Not Crossing A Public Roadway Upon Which The Public Is Allowed To Travel While Construction Is Underway:</b>                      4G Limit vehicular speeds to 15 miles per hour or less while traveling on the work site; or                      5G Apply water to the top of the load such that the 20% opacity standard, as described in Section 301 of this rule, is not exceeded, or cover haul trucks with a tarp or other suitable closure.</p> <p><b>Offsite Hauling/Transporting Onto Paved Public Roadways:</b>                      6G Cover haul trucks with a tarp or other suitable closure;* and                      7G Load all haul trucks such that the freeboard is not less than 3 inches;* and                      8G Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate(s);* and                      9G Before the empty haul truck leaves the site, clean the interior of the cargo compartment or cover the cargo compartment.*</p> <hr/> <p><b>Cleanup Of Spillage, Carry Out, Erosion, And/Or Trackout:</b>                      1H Operate a street sweeper or wet broom with sufficient water, if applicable, at the speed recommended by the manufacturer and at the frequency(ies) described in subsection 308.3 of this rule; or                      2H Manually sweep-up deposits.</p> <hr/> <p><b>Trackout:**</b>                      1J Install a grizzly or wheel wash system at all access points.                      2J At all access points, install a gravel pad at least 30 feet wide, 50 feet long, and 6 inches deep.*                      3J Pave, starting from the point of intersection with a paved public roadway and extending for a centerline distance of at least 100 feet and a width of at least 20 feet.</p>

Source: Maricopa County Rule 310

\*Mandatory Provisions

\*\*These measures apply to "Worksites with at least 5 acres of disturbed surface area or 100 cubic yards of material hauled per day."

\*\*\*American Society for Testing and Materials standard test methods for measuring moisture content of soil.

The focus of this document is the management of stormwater. However, four of the BMPs discussed in the document are directly related to dust control: stabilized construction

entrance, construction road stabilization, dust control, and silt fence. The applicability of these four BMPs, as depicted in the manual, is shown in figure 27.

Best Management Practice	Perimeter Control/Diversion	Slope Protection	Sediment Trapping	Drainageway and Stream Protection	Temporary Stabilization	Permanent Stabilization	Non-sediment Pollution Control
Stabilized Construction Entrance			●		●		
Construction Road Stabilization	●				●		
Dust Control			●		●		
Silt Fence	●		●				

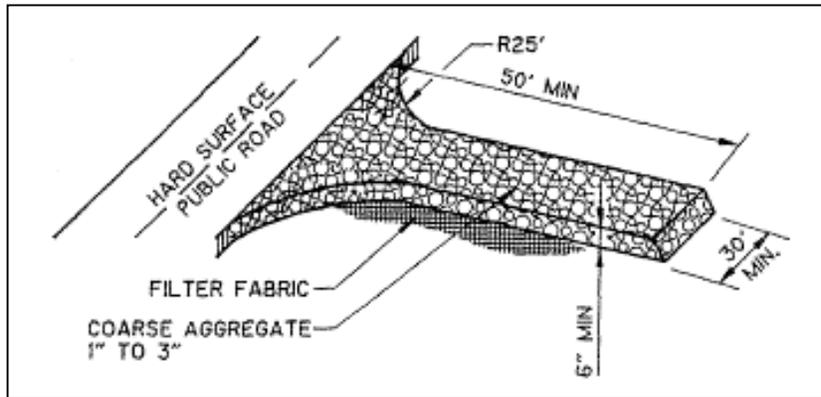
**FIGURE 27. MATRIX OF FLOOD CONTROL DISTRICT BEST MANAGEMENT PRACTICES RELATED TO DUST CONTROL**

Source: Maricopa County Flood Control District, *Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control*

### Stabilizing Construction Site Entrances and Preventing Trackout

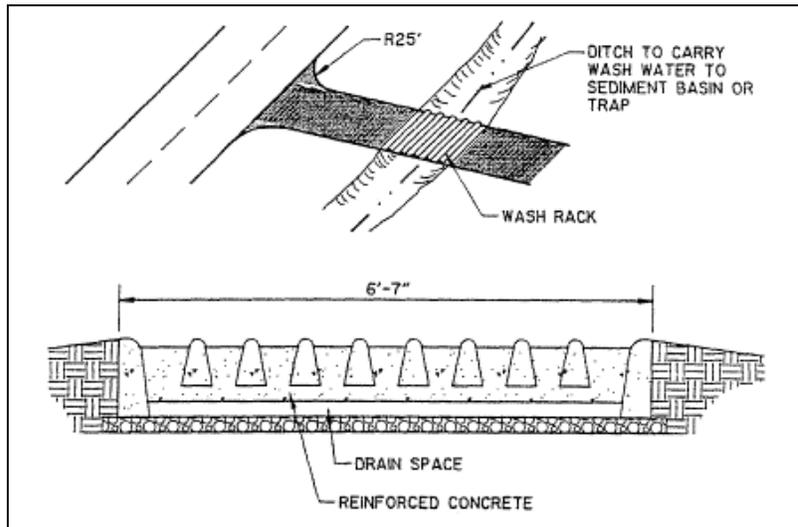
The Flood Control District is interested in preventing trackout from construction sites—referred to in FCD material as “sediment”—from entering and potentially clogging storm drains. Air quality officials underscore the concern that after trackout has dried on top of pavement the finer particles it contains are easily ejected into the air by passing vehicles to become fugitive dust. Stabilizing the entrances and exits to construction sites addresses both these issues. The FCD manual contains specifications for a stabilized construction entrance depicted in figure 28. Note that the specifications depicted in figure 28 are identical to those contained in Rule 310, which specifies a “gravel pad at least 30 feet wide, 50 feet long, and 6 inches deep” (see table 16).

The FCD presents specifications for a “wash rack” (referred to in Rule 310 as a “wheel wash system”) designed to remove sediment from the tires of haul trucks and other vehicles leaving a construction site. The wash rack specifications are shown in figure 29. The alternative is a “grizzly,” or device with elements somewhat resembling a cattle guard, with bars placed perpendicular to the direction of vehicle travel and spaced so as to cause the vehicles traveling over the device to shake vigorously enough to remove trackout from the tires and the undercarriage. Grizzlies, also referred to as “shakers,” are used by an increasing number of contractors in the area, and an example is shown in figure 30.



**FIGURE 28. STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS**

Source: Maricopa County Flood Control District, *Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control*



**FIGURE 29. SPECIFICATIONS FOR WASH RACK**

Source: Maricopa County Flood Control District, *Drainage Design Manual for Maricopa County, Arizona, Volume III, Erosion Control*



**FIGURE 30. EXAMPLE OF SHAKER DEVICE**

Source: Kitchell Contracting, Jeff Lange photo

### ***Construction Road Stabilization***

The FCD promotes the stabilization of construction roads as a means of mitigating erosion. However, the characteristics that make an area susceptible to erosion are similar to those that generate dust.

Rule 310 discusses access roads or haul roads in terms of maximum allowable opacity of fugitive dust emissions from vehicle operations, the amount of allowable silt loading per square foot of roadway surface, or the percentage of silt content. The Construction Road Stabilization BMP contained in Volume III of the FCD drainage design manual, however, provides design and sizing criteria for the roadways summarized as follows:

- Constructed of a 6-inch course of 2- to 4-inch crushed rock, gravel base, or crushed surfacing base course, to be applied immediately after grading or after completion of utility installation within the right-of-way.
- A 4-inch course of aggregate base course may be used in place of the crushed rock.
- Chemical stabilization (dust palliatives) may be used upon compacted native sub-grade.
- Roads should follow the contour of the natural terrain as much as possible.
- Slope should not exceed 15 percent.
- Roadway must be graded to drain transversely.
- Drainage swales (bar ditches) must be provided on each side of the roadway in the case of a normal crown section, or on the downstream side of a superelevated section.
- Simple gravel berms may be used in place of the bar ditches.

- Installed drainage inlets shall be protected to prevent sediment-laden water from entering the drain sewer system.

Note that the Rule 310 provisions and those of the FCD BMP are complementary. The BMP stipulates that roads are to be inspected regularly, especially “after large storm events,” and additional gravel or rock added as needed. Dust palliatives are to be applied in accordance with the manufacturer’s specifications. The Manual contains a more detailed discussion of dust palliatives in the “Dust Control” section.

### ***Dust Control and Silt Fences***

The FCD is concerned with dust control because dust that is either tracked out onto pavement or windblown onto pavement may be carried into the storm sewer system by stormwater runoff. In volume III of the drainage control manual, the FCD includes a table of dust control BMPs for given site situations, which it refers to as “Dust Control Applicators.” This table is presented in table 17 and includes a BMP for silt fences employed by the Maricopa County FCD. BMPs also used by the Metropolitan Nashville FCD are shown for comparison purposes.

### **Maricopa Association of Governments**

Sierra Research, Inc., of Sacramento, California conducted two studies for the MAG, which were reviewed in the course of this task. The *Particulate Control Measure Feasibility Study* was published in January 1997 and the *Most Stringent PM<sub>10</sub> Control Measure Analysis* was published in April 1998. Both of these studies were used in developing control measures for the Revised MAG Serious Area PM<sub>10</sub> Plan submitted to EPA in February 2000. The “Most Stringent Measure Analysis” was included as chapter 10 of that Plan.<sup>[11,12]</sup>

### ***Particulate Control Measure Feasibility Study***

Sierra Research conducted this study to identify PM<sub>10</sub> sources that significantly impact standard violations as recorded at the monitoring stations, to select applicable measures to control these sources, and to analyze the costs and cost-effectiveness of the measures.

The methodology used for the project consisted of the following four steps:

1. Identification of significant sources of PM<sub>10</sub>.
2. Review of applicable control measures
3. Review of analysis guidance.
4. Quantification of emission reductions, costs, and cost-effectiveness.

**TABLE 17. DUST CONTROL BMPs FOR GIVEN SITE CONDITIONS**

Field Condition	Dust Control BMPs									
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt Surfacing	Silt or Sand Fences	Temporary Gravel Construction Entrances/Equipment Wash Down	Haul Truck Covers	Minimize Extent of Area Disturbed	
Disturbed Areas not Subject to Traffic	MN	MN	MN	MN	MN				N	
Disturbed Areas Subject to Traffic			MN	MN	MN				N	
Material Stock Pile Stabilization			MN	MN		MN			N	
Demolition			MN				MN	MN		
Clearing/Excavation			MN	MN					MN	
Truck Traffic on Unpaved Roads			MN	MN	MN			MN		
Mud/Dirt Carry-Out					MN		MN			

Source: Maricopa County Flood Control District, *Drainage Design Manual, Volume III Erosion Control*, January 1993<sup>[10]</sup>  
 MN = BMP checked by both Metropolitan Nashville - Davidson County and Maricopa County Flood Control District<sup>[10,13]</sup>  
 N = BMP checked by Metropolitan Nashville - Davidson County only<sup>[13]</sup>

Construction-related sources of PM<sub>10</sub> identified as potentially significant include paved road travel (atmospheric ejection of trackout), unpaved road travel, industrial paved road travel, and construction site preparation. The critical source parameters of these sources are listed in table 18. The source parameters were then screened (Step 2) to eliminate those related to stationary and industrial sources, because applicable laws for controlling these already existed at the time of the project. The source parameters related to nitrogen oxide emissions were also eliminated because EPA had determined that reducing such emissions might adversely impact ozone attainment.

**TABLE 18. CRITICAL SOURCE PARAMETERS OF CONSTRUCTION-RELATED POTENTIALLY SIGNIFICANT SOURCES OF PM<sub>10</sub>**

<b>Significant Source</b>	<b>Critical Source Parameters</b>
Paved Road Travel	Total Dust Loading Silt Content of Dust Loading Vehicle Miles Traveled
Unpaved Road Travel	Soil Silt Content Average Vehicle Speed Average Vehicle Weight Vehicle Miles Traveled
Industrial Paved Road Travel	Total Dust Loading Silt Content of Dust Loading Vehicle Miles Traveled
Construction Site Preparation	Soil Silt Content Soil Moisture Content Vehicle Miles Traveled

Source: Sierra Research, Inc., *Particulate Control Feasibility Study*, Sacramento, California, January 1997.

In Step 3, available guidelines from MAG and EPA were reviewed to determine the appropriate methodologies for use in quantifying the emissions. An earlier MAG report titled *Feasibility and Cost-Effectiveness Study of New Air Pollution Control Measures Pertaining to Mobile Sources* was used as a resource for the methodologies. Nonattainment areas classified as “serious” are required to select from the Best Available Control Measures (BACMs). In Step 4, “...baseline emission rates were computed over a 24-hour averaging period using the most appropriate emission factor models and local activity data available.” In this way, the potential pounds of PM<sub>10</sub> emissions reduced per day per control measure was estimated. Finally the cost of each control measure per pound reduced, including overhead costs such as administration and enforcement, was calculated. The cost-effectiveness of each of the control measures pertaining to PM<sub>10</sub> generating activities related to construction is shown in table 19.

**TABLE 19. PROJECTED COST EFFECTIVENESS OF PM<sub>10</sub> CONTROL MEASURES FOR MAG REGION IN 2001**

Control Methods		Cost Effectiveness of PM <sub>10</sub> Reduction in 2001 (\$/lb)
22(b)	Traffic Reduction/Speed Control Plans for Unpaved Roads	\$0.12
22(c)	Prohibition of Unpaved Haul Roads, and Parking or Staging Areas	\$0.20
22(a)	Surface Treatment to Reduce Dust From Unpaved Roads and Alleys (e.g., Paving, Chemically Stabilizing, or Watering)	\$0.35
22(d)	Surface Treatment to Reduce Dust From Unpaved Driveways and Parking Lots	\$0.92
21(c)	Control of Emissions Due to Material Transport (e.g., Truck Covers, Freeboard Requirements, Material Dampening, or Responsibility for Clean Up of Spills)	\$1.25
21(d)	Frequent Routine Sweeping or Cleaning of Paved Roads	\$1.31
23(a)	Dust Control Plans for Construction, Demolition, Land Clearing, and Industrial Sites (Including Active Landfills)	\$1.71
21(f)	Traffic Rerouting or Rapid Cleanup of Temporary Sources of Dust on Paved Roads (e.g., Due to Spills or Runoff)	\$1.91
21(b)	Curbing, Paving, or Stabilizing Shoulders on Paved Roads (Includes Painting Stripe on Outside of Travel Lane)	\$6.05
21(e)	Intensive Street Cleaning Requirements for Industrial Paved Roads and Streets Providing Access to Construction or Industrial Sites	\$18.37
23(b)	Dust Control Measures for Material Storage Piles	\$28.26
21(a)	Paving, Vegetating, and Chemically Stabilizing Unpaved Access Points Onto Paved Roads (Especially Adjacent to Construction or Industrial Sites)	\$28.95
23(c)	Require Dust Control Plans for All Grading Permit Activities	\$71.39
24(b)	Dust Mitigation Plan Submission and Implementation by Property Owner for Vacant Parcels Greater Than 10 Acres	\$106.25
<b>Measures for Which Cost Effectiveness Calculations Are Not Available</b>		
23(d)	Mitigation Bond Requirement for Construction and Development Projects to Provide Funding for Agencies to Control Project Emissions in the Event of Contractor Noncompliance	Insufficient Information: Costs and Benefits of New Program in California Not Yet Available from Implementing Agency
24(a)	Prohibition Against Increase of PM <sub>10</sub> Greater Than 50 Mg/m <sup>3</sup> Across Property Line	Already Addressed Through Other Existing Regulations

Source: Sierra Research, Inc., *Particulate Control Feasibility Study*, Sacramento, California, January 1997.<sup>[XXX]</sup>

### ***Most Stringent PM<sub>10</sub> Control Measure Analysis***

Section 188(e) of the Clean Air Act (CAA) provides for the extension of serious area attainment dates for up to five years—December 31, 2006, in the case of Maricopa County—provided certain requirements are met. Among these, is the requirement that the PM<sub>10</sub> Plan document the most stringent PM<sub>10</sub> control measures included in a State Implementation Plan (SIP), or achieved in practice, in any state that can feasibly be implemented in an area. MAG contracted with Sierra Research, Inc., of Sacramento, California, to prepare an analysis comparing the Most Stringent Measures (MSMs) of other jurisdictions to the measure currently in effect in Maricopa County that addresses an analogous dust generating activity. The report for that project, *Most Stringent PM<sub>10</sub> Control Measure Analysis*, published in May 1998, compared the MSMs with the corresponding Maricopa measures. Those comparisons addressing construction related activities are excerpted and presented in table 20.

Table 20 indicates that the construction dust control measures in Rule 310 are at least as stringent as measures found anywhere else in the country. In some cases, there are minor differences between the Maricopa measure and others, i.e. 3-inch freeboard requirement for Rule 310 vs. 6-inch for South Coast. At the time the MSM analysis was conducted, two of the measures contained in Rule 310 were more stringent than any other comparable measures in the country: traffic rerouting (21f) and dust control plans for residential construction (23a). The Maricopa measures shown in table 20 are all implemented in the February 2000 version of Rule 310 that was included in the Serious Area PM<sub>10</sub> Plan and SIP revision for Maricopa County.

### **CONTROL MEASURE PRACTICES OF OTHER JURISDICTIONS**

The remainder of this chapter documents dust control provisions of other jurisdictions that are related to—or could be applied to—construction activity. Many of these measures pre-date Rule 310 and were likely reviewed in the process of drafting Rule 310.

#### **Clark County**

In June 2001, the Clark County Comprehensive Planning Department submitted an updated PM<sub>10</sub> SIP to EPA, designed to meet all of the Federal Clean Air Act requirements relating to serious PM<sub>10</sub> nonattainment areas.<sup>[14]</sup> This plan was approved by EPA in January 2003. During 2001, Clark County also developed an interim policy on dust palliative use that will be discussed in chapter 3.

The SIP contains an extensive section related to BACMs for construction activities. Potential BACM for fugitive dust caused by construction were identified and evaluated. These measures were expected to reduce the amount of fugitive dust generated by construction activities in Clark County by 34 percent in 2001 and by 68 percent when fully implemented in 2003. The BACM for construction activities that were identified, evaluated, and selected in Clark County are shown in table 21.

**TABLE 20. DETERMINATION OF THE MOST STRINGENT CONTROL MEASURE**

Maricopa Nonattainment Area		Most Stringent Measure Either in or Under Consideration for Inclusion in Another SIP		
Measure	Measure	Rule	Rule	
21 a	Limit fugitive dust emissions to 20% opacity; implement RACMs for earthmoving or dust-generating projects greater than 0.1 acres in size	200.305 310.302 310.401.3a	Limit fugitive dust emissions to 20% opacity at property line; implement 13 ACMs for earthmoving/construction/ demolition/vehicle movement projects greater than 0.5 acres in size	SC 403d I; SC 403d2
	Paving, vegetating and chemically stabilizing unpaved access points	310.311.1a	Remove bulk material trackout within 1 hour chemically stabilize 100' by 20' of access road and remove bulk material trackout daily or whenever visible deposits extend beyond 50' in length	SC 403d5
	Remove bulk material deposits spilling from vehicles onto paved roads or parking staging areas within 6 hours using RACMs that do not cause violation of 20% opacity limit	310.311.1b; 310.311.1c; 310.311.1d	Remove bulk material trackout within 1 hour or chemically stabilize 100' by 20' of access road and remove bulk material trackout daily and whenever visible deposits extend beyond 50' in length	SC 403d5
21 c	Maintenance of 3" freeboard on bulk material haul trucks	310.311.2b	Maintain 6" freeboard on aggregate haul trucks	CVC 23114
	Control of emissions due to material transport	310.311.2c	Clean and/or wash cargo compartments of all haul trucks at delivery site after removal of bulk material with silt content greater than 5% or maintain 6" freeboard on bulk material haul trucks	IC VIII.F6; IC VIII.1.5
21 f	<b>Removal of bulk material deposits spilling from vehicles onto paved roads or parking/staging areas within 6 hours using RACMs that do not cause violation of 20% opacity limit</b>	310.311.1b; 310.311.1c; 310.311.1d	Clean up construction/demolition project-related spills on publicly maintained paved surfaces within 24 hours	MD 403.2C2
	Traffic		Apply dust suppressants to disturbed surface areas in sufficient quantity to limit visible dust emissions to 20% opacity or water at least 80% of the unstabilized area 2 times per day for project greater than 100 acres in size or moving more than 10,000 cubic yards of material per day on more than 3 days each year	SC 403f
22 c	Retrouting or rapid cleanup of dust deposits on paved roads			
	Prohibition of work site unpaved haul roads/parking/staging areas	310.307		

**TABLE 20. DETERMINATION OF THE MOST STRINGENT CONTROL MEASURE (Continued)**

Measure	Maricopa Nonattainment Area		Rule	Most Stringent Measure Either in or Under Consideration for Inclusion in Another SIP	Rule
	Measure	Area			
23 a	Dust control plans for construction/land clearing	<b>Develop and implement dust control plans for non residential construction/demolition projects disturbing more than 0.1 acre</b>	310.302; 200.305	Develop and implement dust control plans for all non- residential construction/demolition projects which maintain natural topography to the extent possible during grading, specify construction of paved roads and parking lots first, and specify construction of upwind structures prior to downwind structures	MD 403.1C3 Searles Valley only)
		Develop and implement dust control plans for residential construction/demolition projects disturbing more than 0.1 acre	310.302; 200.305	Develop and implement dust control plans for projects greater than 100 acres in size or for projects moving more than 10,000 cubic yards of material per day on more than 3 days each year	SC 403f1
23 b	Dust control measures for material storage piles	Develop and implement dust control plans for projects disturbing more than 0.1 acre	310.302; 200.305	Apply water 3 times daily, apply chemical dust suppressants, or install wind breaks within 24 hours to stabilize new man-made deposits of bulk material with a surface area greater than 2,500 ft <sup>2</sup>	SC 403.1 d2; SC 403.1h2B (Coachella Valley Blowsand Area only)
		Require dust control plans for all grading permit activities	310.302; 200.305	Develop and implement dust control plans for projects greater than 100 acres in size or for projects moving more than 10,000 cubic yards of material per day on more than 3 days each year	SC 403f1

Source: *Most Stringent PM10 Control Measure Analysis*, Maricopa Association of Governments, 1998

Note: IC = Imperial County (California) Air Pollution Control District, MD = Mojave Desert (California) Air Quality Management District, CVC = California Vehicle Code, SC = South Coast (California) Air Quality Management District, WAC = Washington Administrative Code

**Maricopa measures in boldface are MSMs**

BACM=Best Available Control Measure; RACM=Reasonably Available Control Measure; MSM=Most Stringent Measure; ADT=Average Daily Traffic

**TABLE 21. SELECTED BEST AVAILABLE CONTROL MEASURES FOR CONSTRUCTION ACTIVITIES IN CLARK COUNTY**

<b>Control Measure</b>	<b>Implemented</b>
Strengthen requirements of existing fugitive dust control rules	Yes
Provide for better enforcement of fugitive dust control rules	Yes
Mitigation bond requirement to ensure implementation of dust control plan	Yes
Dust control plans for construction/land clearing and demolition	Yes
Dust control monitor required for construction sites having more than 50 acres of actively disturbed area	Yes
Trackout control	Yes
Staging areas, equipment storage, and material storage areas	Yes
Use of surfactants or tackifiers	Yes
High-wind operating restrictions	Yes
Phasing land development	Yes -- Partial
Stabilized disturbed inactive surfaces	Yes
Dust controls for blasting of soil and rock	Yes
Dust controls for abrasive blasting	Yes
Dust controls for crushing	Yes
Dust controls for landscaping	Yes
Dust controls for paving/subgrade preparation	Yes
Dust controls for screening	Yes
Dust controls for construction traffic	Yes
Dust controls for trenching	Yes
Dust controls for truck loading	Yes
Dust controls for stockpiles	Yes
Require visible emission limits not to exceed 20% opacity	Yes
Limit visible emissions to 100 feet	Yes
Prevent visible emissions from crossing property line	Proposed

Source: June 2001 *PM<sub>10</sub> State Implementation Plan*, Clark County Comprehensive Planning Department<sup>[14]</sup>

### **Coachella Valley**

Coachella Valley, California, is also currently designated as a serious PM<sub>10</sub> nonattainment area. The valley is an approximately 2,500 square mile area located between the Salton Sea and Banning Pass in South Central California. Like Clark and Maricopa Counties, Coachella Valley has had to develop a supplemental SIP to comply with the NAAQS for PM<sub>10</sub>. The SIP documents the air quality within the valley, the development of a current emissions inventory and a projected future emissions inventory, and an air quality maintenance plan. The document also includes a redesignation request and a natural events action plan.<sup>[15]</sup>

The valley has a dry desert climate that is even hotter and dryer on average than that of Clark and Maricopa Counties. In addition, Coachella Valley has a more frequent occurrence of high winds and blowing sand. Both the annual average and 24-hour levels of PM<sub>10</sub> at both Coachella Valley monitoring sites were just within compliance with the NAAQS standards established by the EPA for the 1992-1995 period. A summary of 1990 “Coachella Valley State Implementation Plan PM<sub>10</sub> Control Measures” is shown in table 22.

**TABLE 22. SUMMARY OF 1990 COACHELLA VALLEY STATE IMPLEMENTATION PLAN PM<sub>10</sub> CONTROL MEASURES FOR CONSTRUCTION/DEMOLITION**

1990 Coachella Valley State Implementation Plan Control Measures	No.	Implementation Status
<b>Construction/Demolition Emissions</b>		
Require watering of all active construction projects: a1) with multiple daily applications, if necessary, to assure proper dust control a2) through the use of reclaimed or agricultural canal water	5a	Local jurisdictions have adopted ordinances implementing section 1-5 (1) of the model dust control ordinance. This section requires submittal of a dust control plan for all projects that require issuance of a grading permit. Watering is the primary control option for earthmoving activities.
Require the chemical treatment of unattended construction areas: b1) Defined as disturbed lands within construction projects which have been or are expected to be unused for at least four consecutive days	5b	Local jurisdictions have adopted ordinances implementing section 1-5 of the model dust control ordinance. This section requires the stabilization of inactive construction sites. Such stabilization must be sufficient to prevent visible emissions from crossing the property line.
Prohibit all construction grading activities on days when wind gusts exceed or are forecast to exceed 30 mph	5c	Implemented via District Rule 403.1. Refer to discussion under control measure number 1d.
Require trucks to maintain at least two feet of freeboard	5d	Provisions established under California Vehicle Code section 23114 require the covering of haul vehicles or, as an alternative, maintaining a minimum freeboard of six inches.
Require all trucks hauling dirt, sand soil, or other specified loose dirt material to be covered	5e	Rule 403, Table 1, Item (1E) and (2E) require haul vehicles to be covered or comply with the vehicle freeboard requirements.
Require planting of tree windbreaks: f1) on the windward perimeter of construction projects; f2) only if adjacent to open lands or lots	5f	Refer to discussion under control measure 1b.
Encourage the planting of vegetative ground cover as soon as possible on construction sites	5g	Local jurisdictions have adopted ordinances implementing section 1-5 (1) of the model dust control ordinance. This section encourages the revegetation of inactive construction sites. Additionally, Rule 403, Table 2, Item (3c) encourages revegetation of construction sites as a cost-effective alternative to chemical stabilization.

Source: *Coachella Valley PM<sub>10</sub> Attainment Redesignation Request and Maintenance Plan*, South Coast Air Quality Management District, December 13, 1996<sup>[15]</sup>

In compliance with Section 175A(d) of the CAA, the Coachella Valley Air Quality Management District has adopted several contingency measures as a part of the proposed air quality maintenance plan. Two of these measures, “minimal trackout” and “chemical stabilization of unpaved road shoulders,” are construction activity related. The minimal Trackout measure proposes four methods of control:

- Paving the last 100 feet from an unpaved roadway connection with a paved road.
- Chemical stabilization of the last 100 feet from an unpaved roadway connection with a paved road at sufficient frequency and concentration to maintain a stabilized surface at all times.
- Installation of dirt removal devices, such as grizzlies.
- Cleaning of public paved road surface when visible trackout occurs.

The proposed method for stabilizing unpaved road shoulders is the use of chemical stabilizers. Alternatives include the use of recycled asphaltic road base and revegetation. Asphaltic road base has a low silt content and a single application, if undisturbed, would last for a number of years. Revegetation is only practical where there is adequate rainfall or an existing irrigation system. The estimated relative cost-effectiveness of both the trackout mitigation and road shoulder stabilization measures, as presented in the SIP, is shown in table 13.

**TABLE 23. RELATIVE COST OF PROPOSED CONTROL OPTIONS FOR COACHELLA VALLEY**

<b>Control Option</b>	<b>Costs</b>
<b>Trackout</b>	
Paving	\$8,496/access connection
Chemical stabilization	\$984/access connection
Track-clean system	\$4,800/access connection
Street cleaning	\$29,970/facility
<b>Stabilization of Unpaved Road Shoulders</b>	
Chemical stabilization	\$2,980 per mile
Asphaltic road base	\$8,500 per mile

Source: *Coachella Valley PM<sub>10</sub> Attainment Redesignation Request and Maintenance Plan*, South Coast Air Quality Management District, December 13, 1996<sup>[15]</sup>