

ATTACHMENT 6

STAFF REPORT

PROPOSED RULE 55, FUGITIVE DUST

Ventura County Air Pollution Control District

**669 County Square Drive
Ventura, California 93003**

April 8, 2008



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DISCLAIMER

This report contains references to company and product names to illustrate product availability. Mention of these names is not to be considered an endorsement by the Ventura County Air Pollution Control District.

EXECUTIVE SUMMARY

Particulate pollution has been linked to increases in asthma attacks, chronic bronchitis, hospitalizations for heart and lung illnesses, emergency room visits, lung cancer, and premature death of people with pre-existing cardiac and respiratory illnesses. Particulate matter pollution (collectively referred to as PM) consists of very small particles suspended in the air and includes particles smaller than 10 microns in size (PM10).

Ambient PM is comprised of both directly emitted PM such as fugitive dust and soot, as well as secondary PM formed in the atmosphere from reactions involving precursor pollutants including oxides of nitrogen, volatile organic compounds, and sulfur oxides (NOx, VOC, and SOx). Secondary PM and combustion soot tend to be fine particles less than 2.5 microns in size (PM2.5), while fugitive dust is larger in size.

PM control regulations have already been adopted by the Ventura County Air Pollution Control District (VCAPCD) to:

- Control secondary PM precursors (NOx, VOC, and SOx) from combustion and coating sources.
- Control directly emitted PM from incinerators and fuel burning equipment.
- Control PM emissions from asphalt plants, smelters, forges, material dryers, and others.
- Regulate agricultural burning.
- Control general visible emissions (opacity).
- Control PM from commercial charbroiling.

APCD also has incentive programs to reduce directly-emitted PM and PM precursors from heavy duty diesel engines. A transportation outreach program also reduces PM emissions from light duty vehicles.

Because Ventura County fails to meet state ambient health standards for PM, a 2003 state law (SB 656) requires the Ventura County Air Pollution Control District (APCD) to adopt additional new regulations to reduce particulate pollution.

On June 28, 2005, the Ventura County Air Pollution Control Board (Board) approved staff's plan to develop new PM control measures. Staff is proposing an all encompassing fugitive dust regulation based on South Coast AQMD Rule 403. Proposed Rule 55,

Fugitive Dust, will impact any man-made condition capable of generating fugitive dust. Affected sources include bulk material handling facilities, construction/demolition sites, storage piles, unpaved roads, off-field agricultural sources, and earth-moving operations.

To reduce compliance costs, the rule is proposed as a standards-based rule rather than requiring prescribed control methods. The exception to this regulatory approach is that control methods are prescribed for controlling track-out at bulk material handling facilities and for controlling fugitive dust from truck hauling. The following new standards are proposed to reduce fugitive dust emissions:

1. No visible dust 50 feet beyond the property line.
2. New 20 percent opacity limit.
3. New track-out limit of 25 feet.
4. No visible dust over 100 feet in length during earthmoving activities.

However, the proposed rule provides some flexibility by allowing the operator to be exempt from the opacity and track-out standards listed above if documented active steps are taken to reduce fugitive dust emissions. The prescribed steps are discussed in more detail in the Section on Conditional Exemptions starting on page 14. No similar exemption is proposed from the fourth standard since a 100 foot or greater dust plume should be a violation because of the magnitude of the dust emission.

Prescribed requirements are proposed for controlling track-out from bulk material handling facilities. These are permanent facilities already permitted by APCD and have relatively high truck traffic. Flexibility is provided by allowing the source to choose from a range of control measures for each vehicle egress point including installing a gravel pad, paving the surface, utilizing a rumble grate, utilizing a wheel washing system, or any other control measure that prevents track-out.

Prescribed requirements on the loading of trucks for hauling soil or bulk materials are based on vehicle code requirements. The entire surface area of the load should be enclosed, covered with tarps, or a minimum 6 inches of freeboard should be maintained. Other

effective dust prevention techniques may also be utilized.

Exemptions are being proposed for on-field agricultural operations and paved roadway excluding track-out situations. Brief recordkeeping is required if conditional exemptions are being claimed from fugitive dust emission standards. A high wind exemption at 25mph or higher is proposed from standards for Opacity, Visible Dust Beyond the Property Line, and 100 foot dust plumes from earthmoving operations provided specified control measures are implemented (See Rule 55, Table 1).

The estimated emission reductions are 6 tons per day of PM₁₀. This is based on the 2001 inventory of 26 tons per day of PM₁₀, and assumes that fugitive dust comprises about 77 percent of the sample and the control effectiveness of the proposed rule is about 30

percent. Since many of the impacted sources are already in compliance with the proposed rule requirements or existing regulations, the actual control effectiveness of the proposal has been estimated at 30 percent.

The estimated cost-effectiveness has been based on the estimates published by other air districts have already adopted fugitive dust rules. The cost-effectiveness ranges of the proposal from \$304 per ton of PM reduced for earthmoving operations to \$7,930 per ton of PM for Track-Out controls based on published costs estimated by the San Joaquin Air Quality Management District. For comparison, new sources subject to Best Available Control Technology requirements are required to spend up to \$10,000 per ton of PM reduced for particulate controls.

BACKGROUND

Health Impacts of Particulate Matter

The effects of inhaling particulate matter has been widely studied in humans and animals and include, asthma, lung cancer, cardiovascular issues, and premature death. Those most sensitive to particle pollution include infants and children, the elderly, and persons with heart and lung disease. The size of the particle is a main determinant of where in the respiratory tract the particle will come to rest when inhaled. Larger particles are generally filtered in the nose and throat and do not cause problems, but particulates less than 10 microns (PM₁₀) can settle in the bronchi and lungs and cause health problems. The 10 micron size does not represent a strict boundary between respirable and non-respirable particles, but has been agreed upon for monitoring of airborne particulate matter by most regulatory agencies.

Similarly, particles smaller than 2.5 microns (PM_{2.5}), tend to penetrate into the gas-exchange regions of the lung, and very small particles (< 100 nanometers) may pass through the lungs to affect other organs. In particular, a study published in the *Journal of the American Medical Association* (Pope et. al, 2002), indicates that PM_{2.5} leads to high plaque deposits in arteries, causing vascular inflammation and atherosclerosis — a hardening of the arteries that reduces elasticity, which can lead to heart attacks and

other cardiovascular problems. Researchers suggest that even short-term exposure at elevated concentrations could significantly contribute to heart disease.

There is also evidence that particles smaller than 100 nanometers can pass through cell membranes. For example, particles may migrate into the brain. It has been suggested that particulate matter can cause similar brain damage as that found in Alzheimer patients. This research was done by Dr. Lilian Calderon-Garciduenas of the National Institute of Pediatrics in Mexico City and a postdoctoral student in the environmental pathology program at the University of North Carolina at Chapel Hill. Particles emitted from modern diesel engines (commonly referred to as Diesel Particulate Matter, or DPM) are typically in the size range of 100 nanometers (0.1 microns). In addition, these soot particles also carry carcinogenic components like benzopyrenes adsorbed on their surface.

The large number of deaths and other health problems associated with particulate pollution was first demonstrated in the early 1970s (Lave et. al, 1973) and has been reproduced many times since. PM pollution is estimated to cause 20,000-50,000 deaths per year in the United States (Mokdad et. al, 2004) and 200,000 deaths per year in Europe).

Particulate Matter (PM) Air Quality in Ventura County

The U.S. Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (ARB) have adopted ambient air quality standards for PM10 and PM2.5 (Table 1). California's standards are the most health-protective standards in the nation, and are designed to provide additional protection for the most sensitive groups of people, including infants and children, the elderly, and persons with heart or lung disease. Ventura County met the federal PM10 standards in past years, but may not meet the 2006 federal PM2.5 standard in the future based on past measurements. Both the state PM10 and PM2.5 standards were exceeded in the county.

	California ($\mu\text{g}/\text{m}^3$)	National (2006) ($\mu\text{g}/\text{m}^3$)
PM10		
Annual	20	revoked
24-hour	50	150
PM2.5		
Annual	12	15
24-hour	35	35

Table 1. State and National Particulate Matter Ambient Air Quality Standards. The standards are expressed in micrograms per cubic meter (mg/m^3).

Ambient PM is comprised of both directly emitted PM such as fugitive dust and soot, known as primary PM,

as well as PM formed in the atmosphere from the reactions of precursor gases - known as secondary PM. These precursor gases include nitrogen oxides (NOx), sulfur oxides (SOx), volatile organic compounds (VOC), and ammonia.

Sources of ambient PM include combustion sources such as trucks and passenger cars, off-road equipment, industrial processes, residential wood burning, and forest and agricultural burning; fugitive dust from paved and unpaved roads, construction, mining and agricultural activities; and ammonia from sources such as livestock operations, fertilizer application, and motor vehicles. In general, combustion processes form fine particles, whereas emissions from dust sources tend to be coarse particles.

In Ventura County, PM concentrations are measured every sixth day at five locations (El Rio, Piru, Simi Valley, Ojai and Thousand Oaks) – for a total of about 300 air samples per year. Both PM10 and PM2.5 are measured at four of the locations. PM10 alone is measured at the Ojai monitoring station.

Table 2 is a summary of recent PM10 and PM2.5 concentrations and exceedances of the California PM standards. Both California PM10 standards (24-hour and annual average) are exceeded at all five Ventura County sites.

Table 2 – PM10 and PM2.5 Concentrations and Exceedances

	Number of exceedances of the state PM10 standard 2001 through 2003. (measured)	Estimated* number of days exceeding the state PM10 standard in 2003. (California Standard is $50 \text{ mg}/\text{m}^3$)	Annual Average (2003) PM10 concentration. (California Standard is $20 \text{ mg}/\text{m}^3$)	PM10 Maximum Measured Concentration. (Average of top 4 measurements in 2003)	Annual Average (2003) PM2.5 concentration. (California Standard is $12 \text{ mg}/\text{m}^3$)	PM2.5 Maximum Measured Concentration. (Average of top 4 measurements in 2003)
Simi Valley	12 days	31.1 days	$30 \text{ } \mu\text{g}/\text{m}^3$	$93 \text{ } \mu\text{g}/\text{m}^3$	$14.2 \text{ } \mu\text{g}/\text{m}^3$	$54 \text{ } \mu\text{g}/\text{m}^3$
El Rio	10 days	28.6 days	$29 \text{ } \mu\text{g}/\text{m}^3$	$94 \text{ } \mu\text{g}/\text{m}^3$	$11.8 \text{ } \mu\text{g}/\text{m}^3$	$44 \text{ } \mu\text{g}/\text{m}^3$
Thousand Oaks	4 days	20.1 days	$25.8 \text{ } \mu\text{g}/\text{m}^3$	$58 \text{ } \mu\text{g}/\text{m}^3$	$12 \text{ } \mu\text{g}/\text{m}^3$	$27 \text{ } \mu\text{g}/\text{m}^3$
Ojai	3 days	12.2 days	$20.7 \text{ } \mu\text{g}/\text{m}^3$	$47 \text{ } \mu\text{g}/\text{m}^3$	NA	NA
Piru	3 days	12.6 days	$27 \text{ } \mu\text{g}/\text{m}^3$	$60 \text{ } \mu\text{g}/\text{m}^3$	$11 \text{ } \mu\text{g}/\text{m}^3$	$24 \text{ } \mu\text{g}/\text{m}^3$

* Takes every sixth day sampling schedule into consideration

Source: <http://www.arb.ca.gov/adam/welcome.html>

Table 2 shows that the California 24-hour PM10 standard is exceeded at all monitoring sites in the County - most often at the Simi Valley site – 31 days in 2003 (est.). All County monitoring sites exceed the state annual average PM10 standard. The state annual average PM2.5 standard is exceeded only at the Simi Valley site, but all sites are close to the exceedance threshold. The state and federal 24 hour PM 2.5 standard at 35 µg/m³ has been exceeded at both Simi Valley and El Rio sites.

Coarse particles (between 2.5 and 10 microns) are almost always a significant portion of total PM10. In fact, the average of the coarse fractions for all samples (not limited to samples collected on exceedance days) during 2001, 2002, and 2003 is over 50 percent. However, the local emission sources and local meteorology can significantly impact the coarse particle fractions, which can range from a low of 18 percent to as high as 88 percent.

	Simi Valley	Thousand Oaks	El Rio	Piru
Coarse Particles (% by weight)	52%	52%	57%	56%

Table 3 – Average Percent of Particles (by weight) that are Coarse Particles (2.5 mm to 10 mm)

Note: Data derived from separate samples (PM2.5 and PM10) collected simultaneously using two separate techniques.

The following figures show monthly averages of PM10 and PM2.5 at four monitoring stations: El Rio (Coastal Inland), Simi Valley (Inland Valley), Thousand Oaks and Piru. A common pattern emerges for all four stations. Both the PM2.5 and PM10 values follow the ozone season, which lasts roughly from April through October. Since a significant part of both PM2.5 and PM10 are the result of secondary particle formation in the atmosphere, stable meteorological conditions with low inversions will increase PM concentrations. Direct particle emissions (primary) are also more concentrated when atmospheric dispersion is reduced.

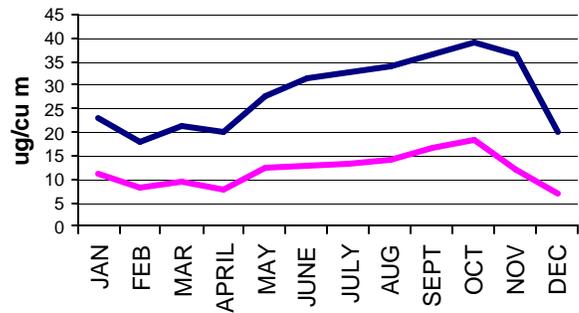


Figure 1 – El Rio Monthly Average PM10 and PM2.5 Concentrations (micrograms per cubic meter). Monthly averages of all measurements taken from 2001 through 2003.

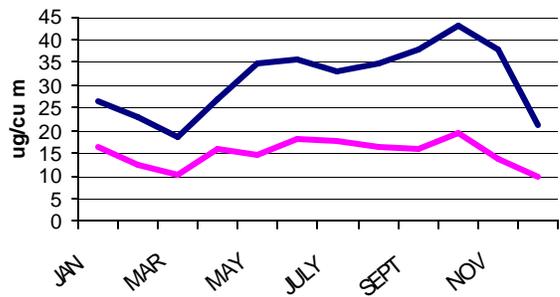


Figure 2 – Simi Valley Monthly Average PM10 and PM2.5 Concentrations (micrograms per cubic meter). Monthly averages of all measurements taken from 2001 through 2003.

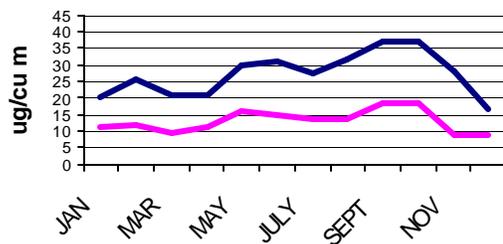


Figure 3 – Thousand Oaks Monthly Average PM10 and PM2.5 Concentrations (micrograms per cubic meter). Monthly averages of all measurements taken from 2001 through 2003.

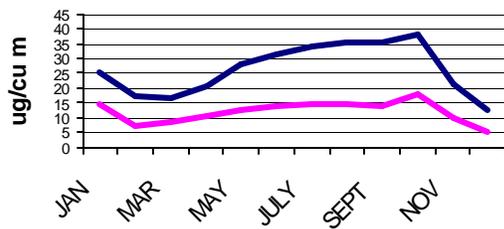


Figure 4 – Piru Monthly Average PM10 and PM2.5 Concentrations (micrograms per cubic meter). Monthly averages of all measurements taken from 2001 through 2003.

Existing Regulations for Controlling PM

Ventura County APCD has already adopted rules to regulate both primary and secondary PM. Primary PM from stationary sources is regulated by the following rules:

- Rule 26, New Source Review
- Rule 50, Opacity
- Rule 52, Particulate Concentration
- Rule 53, Particulate - Process Weight
- Rule 56, Open Burning
- Rule 57, Incinerators
- Rule 57.1, Particulate Matter from Fuel Burning Equipment
- Rule 62.7, Asbestos
- Rule 74.1, Abrasive Blasting
- Rule 74.25, Restaurant Cooking Operations

Secondary PM formed from atmospheric reactions of precursor gases (Oxides of Nitrogen, Oxides of Sulfur and Volatile Organic Compounds) are regulated by many district rules that have been adopted to reduce the ambient ozone levels. These include regulations for stationary combustion sources such as boilers, heaters, turbines, and engines, and source that emit organic solvents including coatings, adhesives, fiber glass manufacturing, and solvent cleaning. Large sources of volatile organic compounds regulated by district rules include gasoline marketing and oil and natural gas production and storage. Sulfur oxides are regulated by rules governing the sulfur content of fuels.

ARB also regulates PM emissions by regulating the mobile sources, mainly internal combustion engines. A recent program to control toxic particulates generated by diesel engines will reduce PM from both stationary and mobile diesel engines. Besides regulations, the district has incentive programs to

replace older heavy duty diesel engines with engines burning cleaner fuels such as natural gas or having particulate control equipment, such as particulate traps or oxidation catalysts.

However, even with all these existing regulations, the county remains in violation of the state standard for PM. As a result of recent legislation (SB 656), the district is required to do more to help meet the ambient PM standard. This is the main basis for this proposed rule action to control fugitive dust. Fugitive dust is a significant portion of the PM problem, and this regulatory action will fill in a gap in an area that has not been formally regulated by the District.

Senate Bill 656

Senate Bill 656 (Health and Safety Code 39614), was adopted on October 9, 2003 by the legislature to reduce particulate matter emissions and reduce public exposure to particulate matter. The intent of the bill is to accelerate progress toward meeting the federal and state PM ambient standards. The bill required ARB to consult with air districts, hold at least one public workshop, develop and adopt a list of the most readily available, feasible, and cost-effective control measures to reduce PM 10 and PM 2.5 emissions. These control measures were based upon rules and regulations in effect as of January 1, 2004 for specific emissions source categories and was published by ARB on October 19, 2004. Additional control measures were added on November 18, 2004.

Staff evaluated this ARB list of incentive programs, control measures and district rules, which were presented in Appendix C of the ARB staff report. As stated earlier, many of the control measures on ARB's list are already being implemented by VCAPCD, including the following:

- Rules to control secondary PM precursors (NOx, VOC, and SOx) from combustion and coating sources.
- Rules to control directly emitted PM from incinerators and fuel burning equipment.
- "Grain loading" rules for emissions from asphalt plants, smelters, forges, material dryers, and others.
- A rule to control agricultural burning.
- General visible emission limits (opacity).
- Incentive programs for diesel engine replacements.
- A transportation outreach program.

- A commercial grilling regulation.

VCAPCD does not currently have local regulations to implement the following control measures contained in the ARB list:

- 1) Control of combustion emissions from residential wood burning fireplaces and wood burning heaters
- 2) Control of fugitive dust emissions from:
 - Paved and unpaved roads
 - Unpaved parking lots and staging areas
 - Construction sites
 - Demolition activities
 - Earthmoving and grading operations
 - Carry-out and track-out
 - Bulk material handling
 - Inactive disturbed land
 - Weed abatement activities
 - Agricultural operations

Only combustion emissions from residential wood burning fireplaces and fugitive dust emissions were

included on the ARB list that have yet to be adopted by Ventura County. No increase in PM concentrations is measured during the coldest part of the year that could be attributed to residential wood burning appliances. In fact, PM concentrations are consistently at their lowest during the coldest part of the year. Air districts in Northern California and ones with colder climates where residents use wood fueled stoves for heating are more likely to have a PM problem from smoke formation. Local regulatory restrictions, other than federal or state requirements for new stoves, are not being proposed to comply with PM10 air quality standards.

Therefore, fugitive dust control measures from Section C in that appendix of the ARB staff report will be the focus of our district rulemaking effort because the district does not currently regulate fugitive dust emissions except at bulk material handling facilities. From the ARB list, staff has evaluated the existing district rules from the South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) as possibly applicable to Ventura County (Table 4).

Table 4 – ARB List of Readily Available, Feasible and Cost-Effective Fugitive Dust Control Measures

FUGITIVE PM SOURCE CATEGORIES	APPLICABLE SJVAPCD RULE(S)	APPLICABLE SCAQMD RULE(S)
Construction: Earth Moving/Demolition/Grading	Rule 8021	Rule 403
Inactive Disturbed Land	Rule 8021	Rule 403
Bulk Material: Handling/Storage	Rule 8031	Rule 403
Carryout and Track-out	Rule 8041	Rule 403
Disturbed Open Areas	Rule 8051	Rule 403
Paved Road Dust: New/Modified Public and Private Roads	Rule 8061	Rule 1186
Paved Road: Street Sweeping		Rule 1186
Unpaved Parking Lots/Storage Areas	Rule 8061	Rule 1186
Weed Abatement Activities	Rule 8021	Rule 403
Windblown Dust: Construction/Earth Moving		Rule 403
Windblown Dust: Disturbed Areas		Rule 403
Windblown Dust: Bulk Materials/Storage Piles		Rules 403 and 403.1
Agricultural Operations	Rule 8081	Rules 403, 403.1, 1186

SB 656 also requires the state board and each district to adopt an implementation schedule for the most cost-effective measures on that list after prioritizing the measures based on the effect individual control measures will have on public health, air quality, and emission reductions. The first step was to analyze data from existing air monitoring network, emission inventory, and other scientific studies to identify sources of particulate pollution and prioritize control measures for that pollution and its precursors. This

data analysis is summarized in the prior section on PM air quality in Ventura County. The prioritization and implementation schedule for Ventura County was adopted by our Board on June 28, 2005.

Fugitive Dust Rule Development Schedule

On June 28, 2005, the Ventura County Air Pollution Control Board (Board) approved a plan proposed by

staff to develop new PM control measures. This plan would establish new visible emission (opacity) limits for fugitive dust sources and would include new requirements to prevent vehicles from tracking out soils onto paved roadways where they are

subsequently ground into small PM10 particles and entrained in the air by traffic. The following rule adoption schedule and description of proposed control measures was approved by the Board as Attachment 1 to the Board Letter.

PROPOSED CONTROL MEASURE IMPLEMENTATION SCHEDULE

Table 5: Control Measures to be adopted by 12/31/2007

<u>Construction, demolition, or earthmoving operations</u>
<ul style="list-style-type: none"> • Install equipment such as rumble strips, or implement work practices to reduce track out onto paved roadways.
<ul style="list-style-type: none"> • Operations contributing to track-out should periodically sweep or otherwise remove their track-out material from paved roadways.
<ul style="list-style-type: none"> • Establish visible dust emission limits (opacity).
<u>Bulk material handling and storage facilities</u>
<ul style="list-style-type: none"> • Install equipment such as rumble strips, or implement work practices to reduce track out onto paved roadways.
<ul style="list-style-type: none"> • Facilities contributing to track-out should periodically sweep or otherwise remove their track-out material from paved roadways.
<ul style="list-style-type: none"> • Establish visible dust emission limits (opacity).
<u>Agricultural operations</u>
<ul style="list-style-type: none"> • Install equipment such as rumble strips, or implement work practices to reduce track out onto paved roadways.
<ul style="list-style-type: none"> • Facilities contributing to track-out should periodically sweep or otherwise remove their track-out material from paved roadways.

Table 6: Control Measures to be adopted by 12/31/2008

<u>Unpaved roads</u>
<ul style="list-style-type: none"> • Establish visible dust emission limits (opacity).
<u>Unpaved parking lots and staging areas</u>
<ul style="list-style-type: none"> • Install equipment such as rumble strips, or implement work practices to reduce track out onto paved roadways.
<ul style="list-style-type: none"> • Facilities contributing to track-out should periodically sweep or otherwise remove their track-out material from paved roadways.
<ul style="list-style-type: none"> • Establish visible dust emission limits (opacity).
<u>Weed abatement activities</u>
<ul style="list-style-type: none"> • Establish visible dust emission limits (opacity).

Table 7: Control Measures to be adopted by 12/31/2009

<u>New and modified public and private paved roads</u>
<ul style="list-style-type: none"> • Develop control measures to minimize emissions from unpaved road shoulders.
<u>In-use paved roads</u>
<ul style="list-style-type: none"> • Develop incentives for municipal street sweeping.
<ul style="list-style-type: none"> • Require responsible entities to conduct post-event cleanup of roadways.

The proposed Rule 55, Fugitive Dust, will implement both the control measures to be adopted by December 31, 2007 and those to be adopted by December 31, 2008. Thus, the proposed rule will impact the following sources: construction, demolition, earthmoving operations, bulk material

handling and storage facilities, off-field agricultural operations, unpaved roads, unpaved parking lots and staging areas, and weed abatement activities. This proposal to adopt an all encompassing regulation is based on an industry comment received at the March 1, 2006, Public Consultation Meeting, in which staff

solicited public input on how best to regulate visible dust emissions.

Revised Regulatory Approach to Controlling Fugitive Dust

It is important to note that although the proposed Rule 55 agrees with the Board-approved plan in principle, the regulatory approach has been modified to provide more operator flexibility and further reduce the cost of compliance. This regulatory approach is based on expanding the concept outlined in the June 2005 Board letter which establishes a performance-based opacity limit instead of mandating prescribed dust control techniques. In particular, proposed Rule 55 will include a performance-based standard for track-out of 25 feet on a public paved road instead of mandating specific track-out control techniques. Furthermore, the proposed Rule 55 will allow operator flexibility by allowing operators to be exempt from the track-out standard if preventative measures have been taken and documented by records. Other

performance-based standards in proposed Rule 55 are similar to South Coast AQMD Rule 403 and include the following:

- No visible dust 50 feet beyond the property line
- Opacity limit of 20 percent or greater
- No visible dust plume over 100 feet in length while engaged in earth-moving activities

An exception to this regulatory approach involves prescribing control techniques for two sources of fugitive dust: Bulk material handling facilities and Haul trucks. Prescribed techniques are proposed for bulk material handling facilities because these are permanent sources of air pollution currently permitted by APCD, and they have heavy truck traffic. The prescribed fugitive dust controls proposed for haul trucks regulate the dust generated by the load, and these regulations duplicate current state vehicle code requirements, and still allow for APCD enforcement at the loading facility.

Proposal for Rule 55

Applicability

Proposed Rule 55, Fugitive Dust, will apply to a wide range of sources of fugitive dust including any active operation, which includes any source capable of generating fugitive dust, including but not limited to the following:

- Bulk Material Handling facilities
- Earth Moving Activities
- Construction/Demolition
- Disturbed Surface Areas
- Vehicle movement on unpaved surfaces

Also included in the rule applicability are storage piles, track-out, and off-field agricultural operations. The wide applicability of the proposed rule is loosely based on South Coast AQMD Rule 403, but the regulatory approach of proposed Rule 55 differs significantly from the South Coast rule. The wide applicability was also recommended by the construction industry in a letter to the District dated February 24, 2006.

Proposed Rule Requirements

Fugitive Dust Standard: Visible Dust 50 Feet Beyond the Property Line (Section B.1)

A new standard for fugitive dust sources is proposed which states that no person should cause or allow the emission of visible fugitive dust 50 feet beyond the property line. The importance of this standard is that it provides the District with an effective and easily implemented means to enforce fugitive dust control. Enforcement experience in the South Coast district indicates that visible dust at the property line is a much easier determination for district inspectors than a 20 percent opacity limit that requires strict adherence to an observation protocol.

Fugitive Dust Standard: 20 Percent Opacity Limit (Section B.2)

Opacity is a measure of the degree of visibility impairment caused by a cloud of airborne particulate matter. For example, a thick cloud of dust (called a plume) has an opacity of 100 percent if it totally obscures the visibility of an object behind it. If a faint outline of the object can be observed through the plume, the opacity is less than 100 percent.

A trained observer tested and certified by the U.S. Environmental Protection Agency (U.S.EPA) in the practice of reading opacity, can assign an opacity level to any plume. If only a faint outline can be observed, the certified observer might assign an

opacity reading of 80 percent to the plume. If most of the features of the object can be seen, the certified observer might assign an opacity reading of 15 percent or less to the plume.

APCD Rule 50, Opacity, which has been in effect since 1968, was designed to regulate the opacity of emissions from a defined point such as a smokestack, rather than the opacity of fugitive emissions such as dust generated by vehicle movement and windblown dust. Staff has also reviewed the air quality regulations of the following regions, which have an enforceable limit at 20 percent opacity:

- The South Coast Air Quality Management District (SCAQMD) covers all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. See SCAQMD Rule 403 at www.arb.ca.gov/drdb/sc/cur.htm
- The San Joaquin Valley Air Pollution Control District (SJVAPCD) covers the counties of Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. See SJVAPCD Regulation VIII at www.arb.ca.gov/drdb/sju/cur.htm
- Maricopa County, AZ, includes Phoenix. See Maricopa County Rule 310 at www.maricopa.gov/AQ/ruledesc.asp.
- Clark County, NV, includes Las Vegas. See Clark County Section 41 at www.co.clark.nv.us/Air_Quality/regs.htm

Track-Out Fugitive Dust Standard: Maximum 25 Feet in Length on a Public Paved Road (Section B.3)

Track-Out is defined in the rule (Subsection H.15) as any material that adheres to and agglomerates on vehicle tires or exterior surfaces and is deposited on a public paved road. This source of fugitive dust is typically caused by soil being dragged out of a disturbed or unpaved surface onto a public paved street where vehicle traffic pulverizes and disperses soil particles into the atmosphere.

The proposed track-out standard of a cumulative 25 feet in length is based on a similar standard in South Coast AQMD Rule 403. However, this track-out standard will not apply to operators that keep the records required in Subsection E.4 and implement at least one of the following fugitive dust control measures:

- 1) **Track-Out Area Improvement:** Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a stabilized surface starting from the point of

intersection with public paved surface, and extend for a centerline distance of at least 100 feet with an acceptable width to accommodate traffic ingress and egress from the site.

- 2) **Track-Out Prevention:** Check or clean the undercarriage and wheels on all vehicles before leaving unpaved surface or install a track-out control device that prevents track-out of soil onto paved public roads.
- 3) **Track-Out Removal:** Remove track-out from pavement as soon as possible but no later than one hour after it has been deposited on the paved road.

Thus, operators can become immune from the track-out standard if they have implemented one of several track-out control measures. The simplest control technique is the installation of a rumble grate, a track-out control device that consists of a ground-level metal grate that is designed to remove soil from vehicles tires. An example is pictured below.



Figure 5: Grizzly rumble grate used to prevent track-out.

The second part of the Track-Out requirement is that all track-out should be removed at the conclusion of each workday or evening shift. If a street sweeper is used to remove the track-out, then only a PM10 efficient street sweeper may be used that has been certified by the South Coast AQMD to meet SCAQMD Rule 1186 requirements. A diagram of street sweeper that has been PM10-certified shows the recirculation air flow pattern with a cyclone particulate control device.

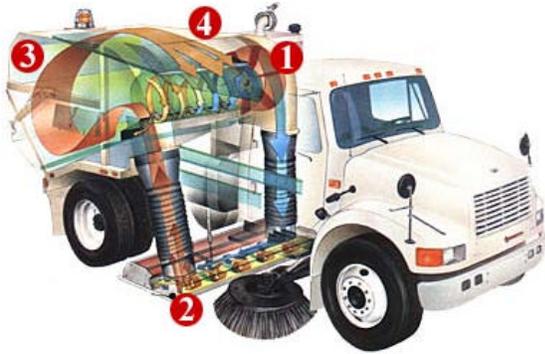


Figure 6: PM-10 certified street sweeper with enclosed air recirculation and cyclone particulate trap.

Fugitive Dust Standard: Visible Dust Plumes over 100 Feet in Length from Earthmoving Operations (Section C.1)

The fourth and final fugitive dust standard in proposed Rule 55 prohibits a visible dust plume over 100 feet in length from earthmoving operations. This standard is also based on SCAQMD Rule 403, and no provisions, except for high winds exceeding 25 mph, have been proposed to create immunity from this standard because of the magnitude of this particulate emission source.

Bulk Material Handling Facilities Track-Out Prevention Requirements (Section C.2)

Prescribed fugitive dust control measures in proposed Rule 55 are only required for two types of sources: Bulk material handling facilities to prevent track-out, and Truck Hauling. The bulk material handling facilities are permanent sources of fugitive dust and have relatively heavy truck traffic. Most of them already have track-out controls, but a few do not.

Examples of these facilities include rock/quarry handling, sand/gravel handling, concrete/ready mix product, and asphalt handling. There are approximately 40 of these sources in the county, and all of them are currently permitted by APCD to control air emissions. Almost all of these permits have conditions to control fugitive dust on the disturbed surface areas of the facility, but the permits do not currently have conditions specifying track-out controls.

The proposed requirement for track-out prevention at bulk handling facilities offers operators the flexibility to choose the particulate control measure or measures

to prevent track-out. Also, there is an exemption for smaller operations having a monthly import or export of less than 2150 cubic yards of bulk material. Basically, the operator must utilize at least one of the following track-out control measures at each vehicle egress site to a public paved road:

- 1) Install a pad consisting of washed gravel (minimum size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.
- 2) Pave the surface at least 100 feet and at least 20 feet wide.
- 3) Utilize a wheel shaker/wheel spreading device, also known as a rumble grate, consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
- 4) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
- 5) Any other control measure or device that prevents track-out onto public paved roads.

Truck Hauling Fugitive Dust Control (Section C.3)

Besides the prescribed requirements for bulk material handling facilities, truck operators and workers loading trucks used for hauling soil or bulk material are also required to take steps to reduce fugitive dust from their loads. At least one of the following controls are required:

- 1) Use properly secured tarps or cargo covering or enclosure that covers the entire surface area of the load.
- 2) Maintain a minimum of 6 inches of freeboard below the rim of the truck bed where the load touches the sides of the cargo area and insure that the peak of the load does not extend above any part of the upper edge of the cargo area.
- 3) Other effective dust prevention control measures.

The second dust control option is based on specification from the vehicle code. The proposed rule specifies the facility or site operator as the responsible party for the implementation of this requirement, thus allowing for APCD enforcement.

Conditional Exemptions

Proposed Rule 55 has conditional exemptions from the all or some of the requirements in the rule to allow an operator that has performed due diligence to eliminate or reduce the possibility of a Rule 55 violation. However, nothing in the proposed rule will provide any sort of immunity from any other district rules including Rule 50, Opacity, or Rule 51, Nuisance, or any state regulations.

Weed Abatement Operations (Section D.1.e)

It is proposed that weed abatement operations may be exempt from all rule requirements provided that only mowing or cutting of weeds is performed leaving at least three inches of weed stubble. Presumably if the soil is not disturbed directly, fugitive dust emissions will be minimized. Alternatively, disking weeds by cutting into the soil may still qualify for this exemption provided effective dust emission prevention control measures are used.

Frequently Traveled Unpaved Road Conditional Exemption (Section D.2)

The operator or owner of a frequently traveled unpaved road may gain immunity from the two fugitive dust standards, Visible Dust Beyond the Property Line (Section B.1) and Opacity (Section B.2), provided certain conditions are followed. For the purpose of this rule, a frequently traveled road is considered to have more than 20 vehicles traveling in either direction per day or more than six vehicles traveling in either direction in any one hour.

The owner or operator has the option of covering the unpaved road with a low silt material such as recycled road base or gravel to a minimum of 4 inches or implementing all of the following control measures:

1. **Control Speed:** Control speed to 15 miles per hour or less on unpaved roads through worker notification, signage, and any other necessary means.
2. **Restrict Access:** Restrict access to private unpaved roads currently used by the public either through signage or physical access restrictions.
3. **Road Treatments:** Treat unpaved and uncovered frequently traveled roads with water, mulch, or a non-toxic chemical dust suppressants that comply with all air and

water quality government standards. If treated, roads shall be treated in a manner that will avoid the sticking of mud to tires that will be carried onto paved public roads.

An important part of qualifying for this conditional exemption is the necessity of keeping simple records documenting and diagramming the roads designated as frequently-traveled and describing the control measures used to control the fugitive dust emissions on those roads (Subsection E.2).

Lightly Traveled Unpaved Road Conditional Exemption (Section D.3)

Similarly, the owner or operator of a lightly traveled unpaved road has an opportunity to gain immunity from visible dust standards in Subsection B.1 and B.2. However, the conditions necessary to qualify for this exemption are less demanding because there are fewer vehicles emitting fugitive dust on these unpaved roads. Again, the lightly-traveled roads are considered to have 20 or fewer vehicle trips per day. Both the following conditions must be implemented to qualify for this exemption:

- 1) **Control Speed:** Control speed to 15 miles per hour or less on unpaved roads through worker notification, signage, and any other necessary means.
- 2) **Restrict Access:** Restrict access to private unpaved roads currently used by the public either through signage or physical access restrictions.

Storage Pile Conditional Exemption (Section D.4)

Owners of a storage pile may qualify for an exemption from the fugitive dust emissions standards in Subsection B.1 and B.2 by keeping the simple records outlined in Section E.3 and by implementing at least one of the following control measures:

- 1) **Wind Sheltering:** Enclose material in a three or four sided barrier equal to the height of the material.
- 2) **Watering:** Apply water at a sufficient quantity and frequency to prevent wind driven dust.
- 3) **Chemical Stabilization:** Apply a non-toxic dust suppressant that complies with all applicable air and water quality government standards at a sufficient quantity and frequency to prevent wind driven dust.

- 4) **Covering:** Install and anchor tarps, plastic, or other material to prevent wind driven dust.

emission source. This allows the observer to screen for the fallout of fugitive dust that is not emitted into the atmosphere.

Opacity Test Method

The proposed test method is modified form of EPA Method 9, and is similar to the current opacity test method used in Rule 50. The proposed method requires that observers be certified by ARB or EPA, and APCD inspectors are trained and tested on a regular basis. The testing involves the generation of different plumes with known opacity as measured by an in-stack transmissometer.

- 3. **Compliance Determination:** Similar to VCAPCD Rule 50, if the observer records twelve readings of 20 percent or greater within an hours time, then the source is in violation of the rule limit. Observations are taken once every 15 seconds, and the twelve readings do not have to be consecutive. Thus, once twelve 20 percent or greater readings are taken in an hour (3 total minutes), then the observer may stop and issue the violation.

The modifications to EPA Test Method 9 are as follows:

Compliance Schedule

- 1. **Observation Distance from Source:** The proposed method allows observers to stand as close as 16.5 feet from the source, while the EPA Method limits the observation distance to 20 feet. This provides a little more flexibility for the inspector to make observations.
- 2. Observers are instructed to read the smoke plume starting at a height of 5 feet above the

The requirements of this proposed rule will become effective six months after the adoption date. Once effective, the regulated community will have a six month honeymoon period, where Notices to Comply rather than Notices of Violations will be issued by APCD staff.

COMPARISON OF PROPOSED RULE REQUIREMENTS WITH OTHER AIR POLLUTION CONTROL REQUIREMENTS

Health and Safety Code 40727.2 requires Districts to compare the requirements of a proposed rule with other air pollution control requirements. These other air pollution control requirements include federal New Source Performance Standards (NSPS), federal National Emissions Standards for Hazardous Air Pollutants (NESHAPS), Best Available Control Technology (BACT) and any other District rule applying to the same equipment.

However, EPA has adopted fugitive dust rules within a particular State Implementation Plan for those areas that are non-attainment with respect to the PM-10 standard. Examples of nonattainment areas having fugitive dust rules include the South Coast AQMD, the San Joaquin Valley APCD, Maricopa County (Arizona) and Mammoth Lakes Planning Area. Because these areas are federal nonattainment areas, the U.S.EPA requires them to implement similar regulations including Best Available Control Measures (BACM) and compliance tests for fugitive dust.

Comparison with Federal and APCD Regulations

Comparison with BACT and APCD Regulations

There are no national federal regulations regarding area source fugitive dust emissions, which includes construction sites, unpaved roads, and agricultural operations. The Environmental Protection Agency (EPA) does regulate toxic fugitive dust at stationary sources through its National Emission Standards for Hazardous Pollutants (NESHAPS). Examples include ferroalloy production, primary copper smelting and secondary lead smelting.

For the purpose of the BACT comparative analysis required by the Health and Safety Code Section 40727.2(a), BACT shall be considered to be the control technology guidance identified in the BACM Tables in South Coast AQMD Rule 403. These

BACM tables contain mandated guidance and fugitive dust control measures for the following construction sources: backfilling, clearing and grubbing, clearing forms, crushing, cut and fill, demolition, disturbed soil, earth-moving activities, importing/exporting bulk materials, landscaping, road shoulder maintenance, screening, staging areas, stockpiles, traffic areas, trenching, truck loading, turf overseeding, unpaved roads, and vacant land.

Rather than mandating prescribed guidance such as those contained in the AQMD BACM tables, Ventura County APCD is proposing emission

standards as an alternative method of controlling emissions. Since Ventura County meets the federal PM-10 standards, the district is not required to duplicate these regulations and test methods. The regulations developed for Ventura County to meet the state standards may take a different approach that is equally effective.

Also, Ventura County does not currently directly regulate area source fugitive dust emissions. In the past, sources of fugitive dust emissions have been regulated using Rule 51, Nuisance.

Impact of the Proposed Rule

PM Emission Inventory

Figure 1 was plotted using emissions inventory information for Ventura County supplied by ARB. It shows the relative contributions for various categories of directly emitted PM10. The chart depicts only directly emitted particles. Fine secondary particles that account for a significant portion of the total PM10 mass are not included in the chart because they are formed in the atmosphere and not directly emitted. Fugitive dust emissions, including windblown dust, vehicle-entrained road dust, construction and demolition dust and farming

dust account for about 77 percent of this directly emitted PM10 inventory. Coarse particles are, by far, the major contributor to PM10 during Santa Ana winds in the dry season. Both PM10 and PM2.5 concentrations rise during the dry season and drop sharply after the first rain in autumn. The PM10 emission inventory in 2001 was approximately 26 tons per day for direct (primary) emissions. Since fugitive Dust emissions account for 77 percent of the total, approximately 20 tons per day of fugitive dust are emitted.

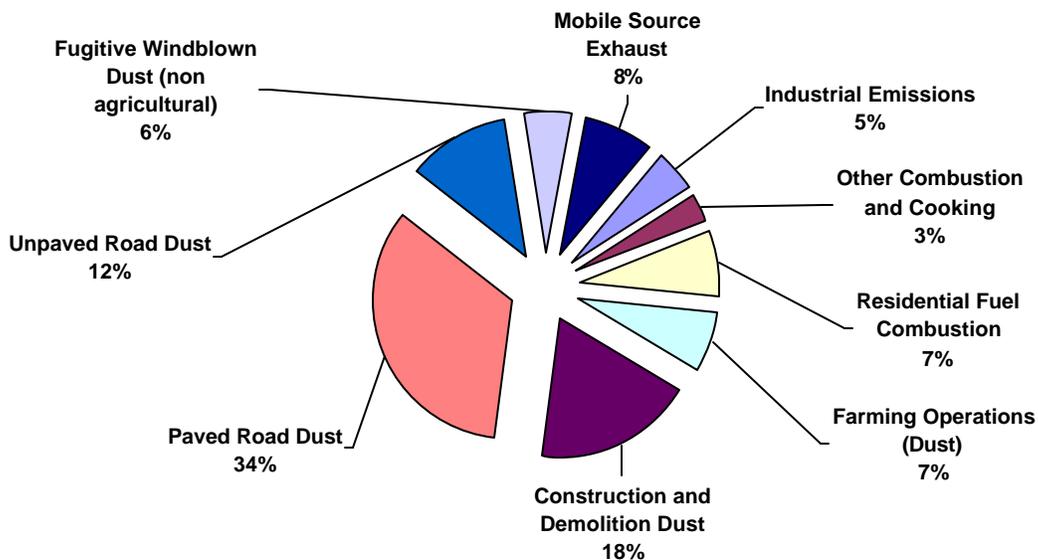


Figure 7 – 2001 Ventura County PM10 Emissions Inventory – Direct Emissions = 26 Tons per Day

PM Emission Reductions

The estimated emission reductions as a result of this rule adoption are estimated at 6 tons per day of PM10. This is based on an estimated control effectiveness of the proposed rule at about 30 percent of the 20 tons per day fugitive dust emission inventory. Since many of the impacted sources are already in compliance with the proposed rule requirements or existing regulations, the actual control effectiveness of the proposal has been estimated at 30 percent.

Much of the construction industry in Ventura County operates in the South Coast AQMD, which first adopted a fugitive dust rule in 1976. Furthermore, city and county planning agencies in Ventura County already require construction sites to take actions to mitigate fugitive dust emissions. However, the adoption of this new rule will create new fugitive dust standards, especially in regards to track-out, and enable District inspectors to enforce those standards.

Besides the construction industry, the rule will apply to track-out caused by the agricultural industry and by bulk materials handling facilities. Unpaved roads, a previously unregulated source, will also be subject to new standards.

Cost-Effectiveness

The estimated cost-effectiveness has been based on the estimates published by the San Joaquin Valley Air Pollution Control District has already adopted fugitive dust rules. The cost-effectiveness ranges of the proposal from \$304 per ton of PM reduced for earthmoving operations to \$7,930 per ton of PM for Track-Out controls based on published costs

estimates. For comparison, new sources subject to Best Available Control Technology (BACT) requirements are required to spend up to \$10,000 per ton of PM reduced for particulate controls. This BACT cost-effectiveness threshold was adopted by the Ventura County Air Pollution Control Board in 1988.

The proposed Rule 55 allows operators to install track-out prevention devices to obtain an exemption from the 25 foot track-out fugitive dust standard. The Grizzly track-out device that comes in 20 foot wide sections are used for quarries and landfills. These are 8 feet in length, and cost \$4,700 per section. The manufacturer recommends three sections or 24 feet in length, which would cost \$14,100. It is also recommended that 1.5 inch aggregate be placed for 50 feet to the Grizzly and also between the Grizzly and the paved road.

The 10 foot wide Grizzly are used for construction sites. These come in 8 foot sections that cost \$2700 per section. Again, three sections are recommended for effective track-out control. Total cost for each point of egress needing control would be \$8,100. A cost-effectiveness analysis is shown in Table 8 based on the installation of two rumble grates and gravel at a typical construction site. The estimated cost analysis for this particular example is about \$3,300 per ton of PM reduced.

Rumble grates are also available for rent from other vendors including California Highway Products. For short term projects (less than two years), rumble grates (8 X 10 feet) can be rented for \$135 per month and \$80 per hour delivery charge.

**Table 8
Cost-Effectiveness Analysis of Rumble Grates at a Construction Site**

Capital Costs		Annualized Costs Assume n = 5 yrs at 10%	
Two 24ft Rumble Grates	\$16,200	Capital Cost	\$4,669
Five tons Gravel	\$ 1,500	Operation/Maintenance	\$1,000
Total	\$17,700	Total	\$5,669
Annual Emissions Reduced (85% PM reduced)= 2 tons/year X 0.85 = 1.7 tons/year			
Cost Effectiveness = Annualized Cost Increment/ Annual Emissions Reduced Increment \$3,335 per ton of PM Reduced			

Socioeconomic Analysis

Health and Safety Code Section 40728.5 requires the District Board consider the socioeconomic impacts of any new rule. The Board must evaluate the following socioeconomic information on proposed new Rule 55.

- (1) *The type of industries or businesses, including small business, affected by the rule or regulation.*

The adoption of Rule 55 will directly affect the forty permitted bulk material handling facilities in the county including the following Standard Industrial Classification (SIC) Codes:

- Crushed Rock Quarries (SIC-1429)
- Sand & Gravel Processing (SIC-1442)
- Asphalt Batch Plants (SIC-2951)
- Concrete Products (SIC-3272)
- Ready Mix Concrete (SIC-3273)

Besides bulk material handling facilities, the construction industry and agricultural industry have operations that emit fugitive dust including earthmoving operations. Also, owners of unpaved roads may be impacted by this regulation.

- (2) *The impact of the rule amendments on employment and the economy of the region.*

Adoption of new Rule 55 is not expected to have a negative impact on either employment or the economy of Ventura County. Most of the affected industry is already utilizing dust control techniques. The added cost of fugitive dust control will not affect economic growth of impacted industries, which are governed by more macro-economic factors.

- (3) *The range of probable costs, including costs to industry or business, and including small business, of the rule or regulation.*

Probable cost-effectiveness will range from \$304 to \$7,930 per ton of Particulate Matter reduced.

- (4) *The availability and cost-effectiveness of alternatives to the rule or regulation being proposed or amended.*

The District could have proposed the Best Available Control Measures (BACM) from the tables in SCAQMD Rule 403 for fugitive dust control. However, the flexibility and cost savings from the proposed regulatory approach would have been sacrificed. The District is proposing emission standards rather than prescribing control techniques, except for the bulk material handling facilities.

- (5) *The emission reduction potential of the rule or regulation.*

The anticipated emission reduction potential of the proposed rule is about 6 tons per day of direct PM-10 emissions.

- (6) *The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air standards pursuant to Chapter 10 (commencing with Section 40910).*

Ventura County is currently a non-attainment area for the state ambient standard for PM-10. Health and Safety Code Section 39614 requires that every air pollution control district that violates California ambient air quality standards for particulate matter adopt cost-effective control measure to control these emissions and to make progress toward attaining these standards.

ENVIRONMENTAL IMPACTS OF METHODS OF COMPLIANCE/CEQA

California Public Resources Code Section 21159 requires the District to perform an environmental analysis of the reasonably foreseeable methods of compliance. The analysis must include the following information on proposed new Rule 55:

- (1) *An analysis of the reasonably foreseeable environmental impacts of the methods of compliance.*
- (2) *An analysis of the reasonably foreseeable mitigation measures.*
- (3) *An analysis of the reasonably foreseeable alternative means of compliance with the rule or regulation.*

Table 4 lists some reasonably foreseeable compliance methods, the environmental impacts of those methods, and measures that could be used to mitigate the environmental impacts. For a comprehensive analysis of the environmental impacts, an Environmental Impact Report was prepared for this rule adoption.

**Table 9
Environmental Impacts and Mitigations of Methods of Compliance**

Compliance Methods (including all reasonably foreseeable alternative means of compliance)	Reasonably Foreseeable Environmental Impacts	Reasonably Foreseeable Mitigation Measures
Treating Unpaved Areas with water or chemical dust suppressants.	Storm Water Impacts: Excess treatment or runoff may impact downstream waterways.	The Los Angeles Regional Water Quality Control Board has adopted storm water regulations to mitigate contaminated effluent.
	Water Impacts: Improper or excessive use of chemical dust suppressants containing sodium may impact water quality.	Proposed Rule 55 prohibits the use of chemical dust suppressants that may violate water quality standards.
Installation of wheel washing systems at bulk material handling facilities.	Water Impacts Excessive water usage may impact water quality or storm water runoff.	Los Angeles Regional Water Quality regulates the effluent from stationary sources.

Although the new rule will reduce emissions by an estimate of 6 tons per day of PM, an Environmental Impact Report (EIR) was prepared to examine the air quality impacts from diesel exhaust emissions from watering truck and street sweepers used to comply with the fugitive dust requirements. These diesel PM and NOx emissions will eventually be mitigated by regulations adopted or proposed for adoption by the California Air Resources Board. Until that time when there is full mitigation, staff believes that the reduction of 6 tons per day of PM is positive for air quality despite a significant increase (more than 25 pounds per day) in diesel exhaust emissions.

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