

Fugitive Dust Control

NACT 252





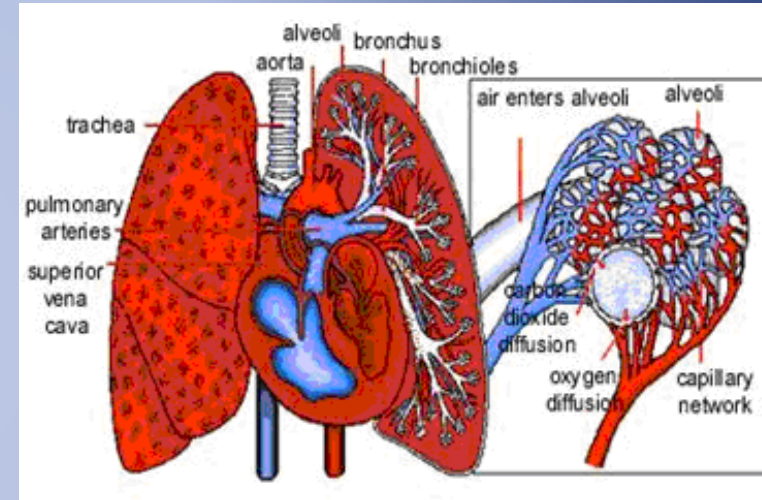


Today's Discussions

- ❖ **Fugitive Dust and PM10 ID**
- ❖ **Health Effects of PM10 Pollution**
- ❖ **Fugitive Dust Sources**
- ❖ **Dust Control Measures**
- ❖ **Fugitive Dust Rules & Regulations**
- ❖ **Dust Control Plans**
- ❖ **VEE and Test Methods**

Criteria Air Pollutants

- **Ozone**
- **Carbon monoxide**
- **Oxides of Nitrogen**
- **Oxides of Sulfur**
- **Particulate Matter (PM10 & PM2.5)**
- **Lead**



Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form	
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year	
			1-hour	35 ppm		
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 $\mu\text{g}/\text{m}^3$ (1)	Not to be exceeded	
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years	
		primary and secondary	Annual	53 ppb (2)	Annual Mean	
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years	
Particle Pollution Dec 14, 2012		PM _{2.5}	primary	Annual	12 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
			secondary	Annual	15 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
			primary and secondary	24-hour	35 $\mu\text{g}/\text{m}^3$	98th percentile, averaged over 3 years
		PM ₁₀	primary and secondary	24-hour	150 $\mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year	

*Most Polluted Regions In the United States**

Ozone (SMOG)

1. Los Angeles Region
2. Bakersfield, CA
3. Visalia, CA
4. Fresno-Madera, CA
5. Hanford, CA
6. Sacramento, CA
7. Houston, TX
8. Dallas, TX
9. Washington-Baltimore, DC

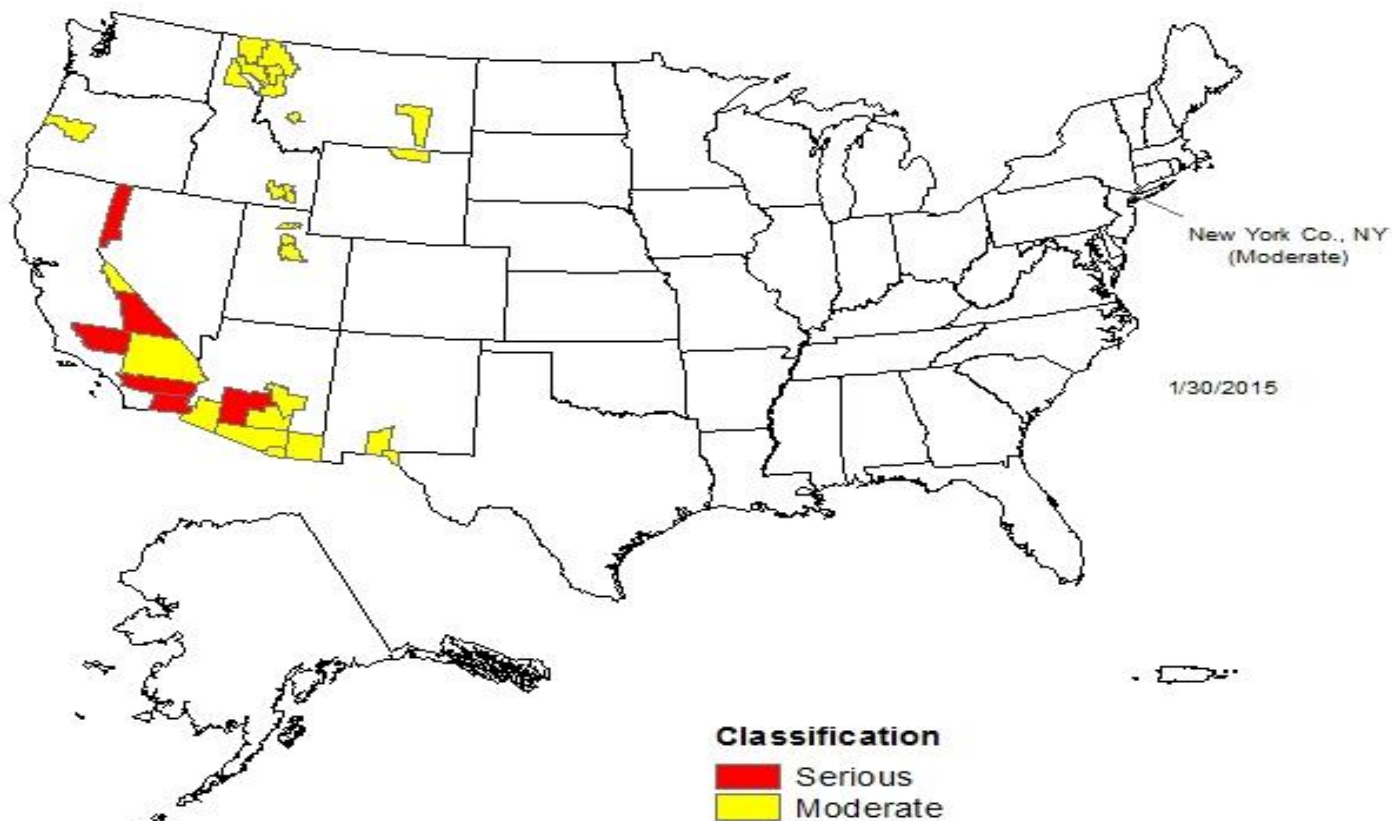
Particulates

1. Bakersfield, CA
2. Fresno-Madera, CA
3. Hanford, CA
4. Los Angeles Region
5. Modesto, CA
6. Salt Lake City, UT
7. Pittsburgh, PA
8. Merced, CA
9. Fairbanks, AK

Classification of PM-10 Nonattainment Areas

Serious	Moderate
Clark Co., NV	Ajo (Pima County), AZ
Coachella Valley, CA	Anthony, NM
East Kern Co, CA	Butte, Mt
Imperial Valley, CA	Columbia Falls, MT
Owens Valley, CA	El Paso Co, TX
Phoenix, AZ	Flathead County, Whitefish, MT
Washoe Co, NV	Fort Hall Indian Reservation, ID

Counties Designated Nonattainment for PM-10

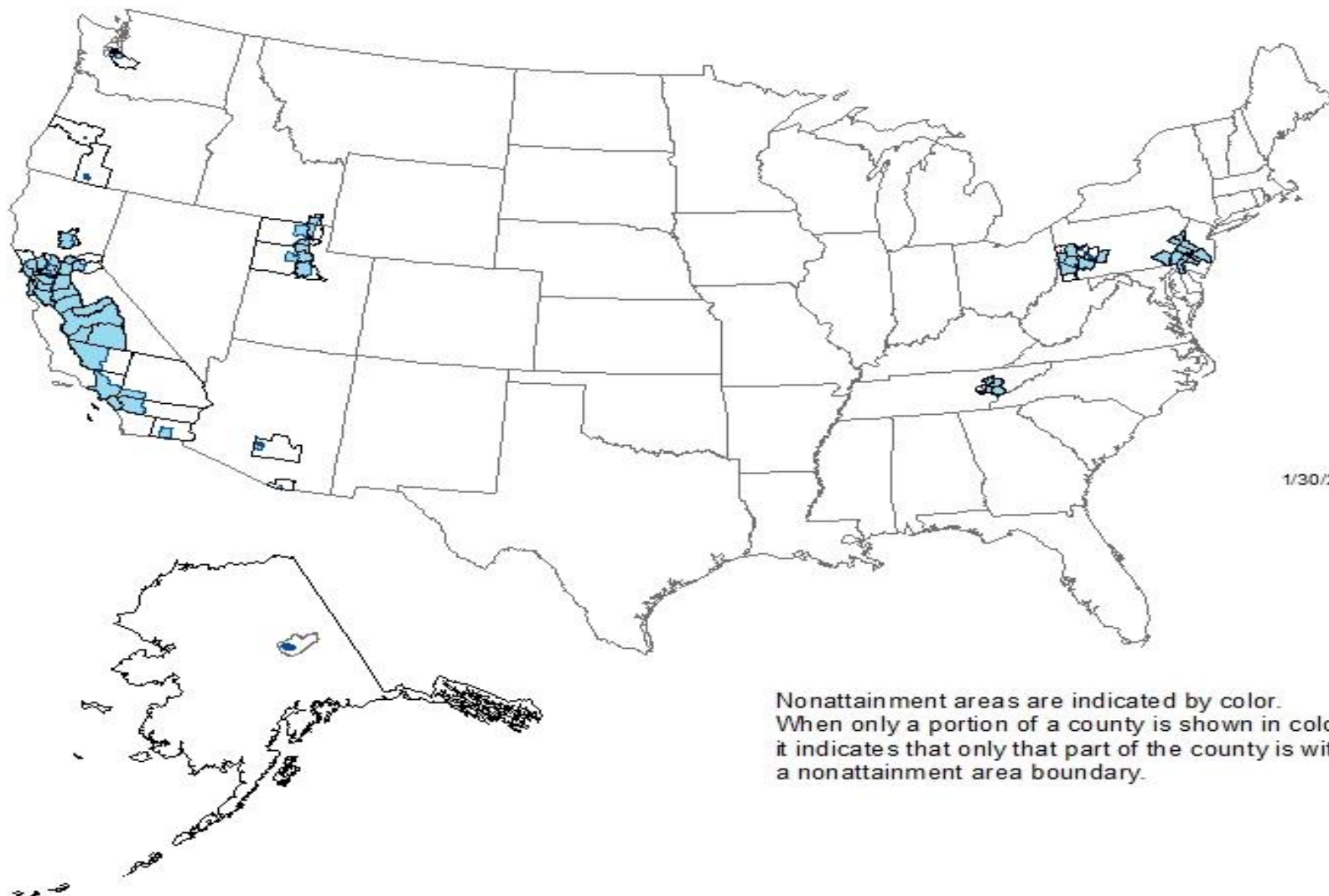


New York Co., NY
(Moderate)

1/30/2015

Classification colors are shown for whole counties and denote the highest area classification that the county is in

PM-2.5 Nonattainment Areas (2006 Standard)

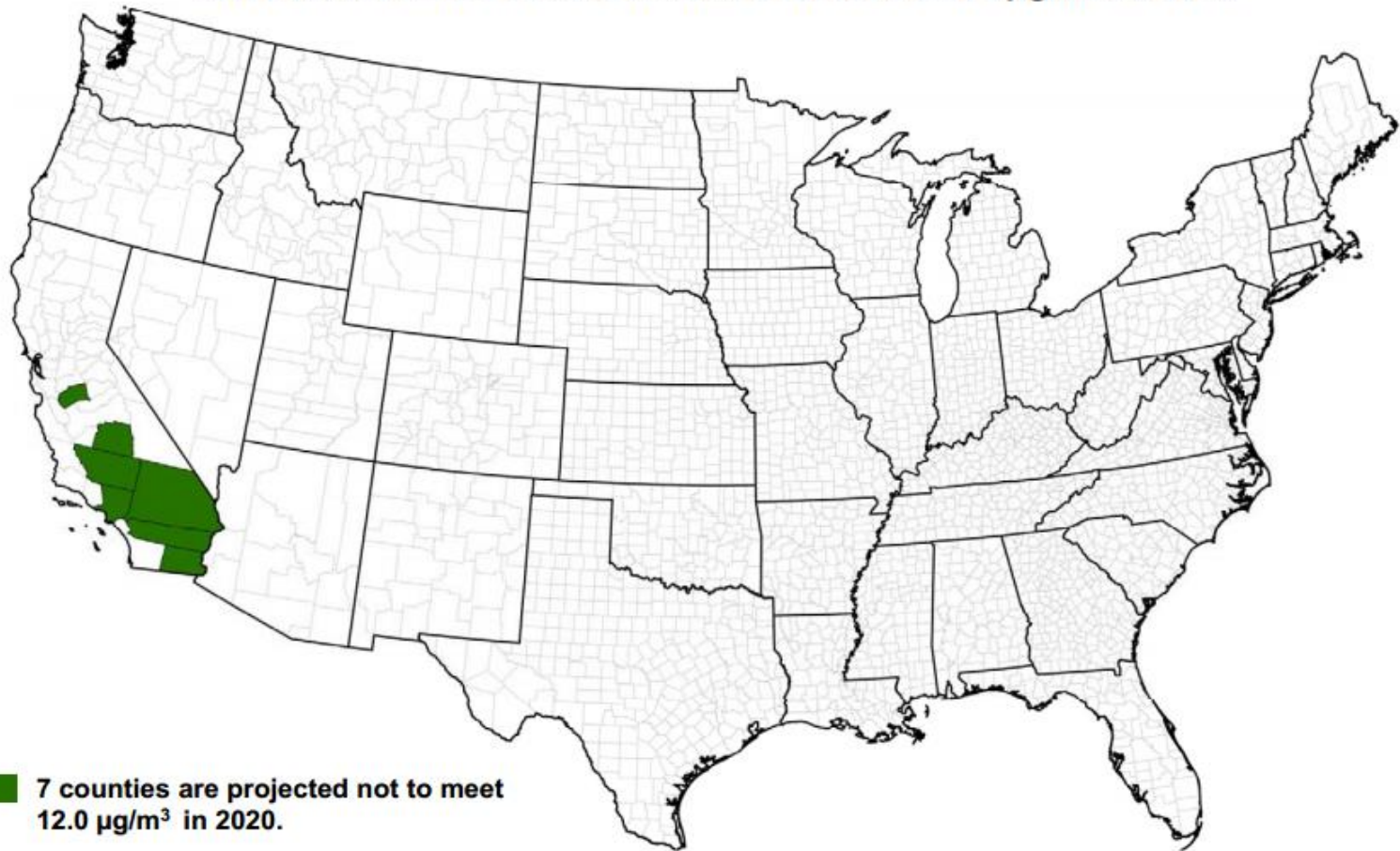


1/30/2015

Nonattainment areas are indicated by color. When only a portion of a county is shown in color, it indicates that only that part of the county is within a nonattainment area boundary.

For PM-2.5 (2006 Standard) Philadelphia-Wilmington, PA-NJ-DE nonattainment area, the New Jersey portion was redesignated on September 4, 2013 and the Delaware portion was redesignated a year later on September 4, 2014. The Pennsylvania portion has not been redesignated. The entire area is not considered in maintenance until all states in a multi-state area are redesignated.

EPA Projections Show 99% of U.S. Counties with Monitors Would Meet the Annual Fine Particle Health Standard of 12 $\mu\text{g}/\text{m}^3$ in 2020



7 counties are projected not to meet 12.0 $\mu\text{g}/\text{m}^3$ in 2020.

All of these are already under requirements to reduce $\text{PM}_{2.5}$.

2012 PM_{2.5} NAAQS Implementation Timeline

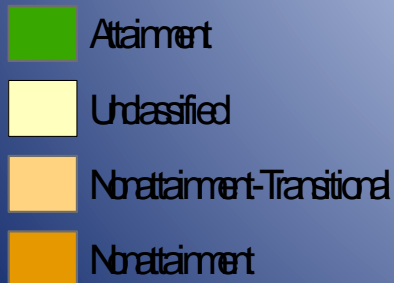
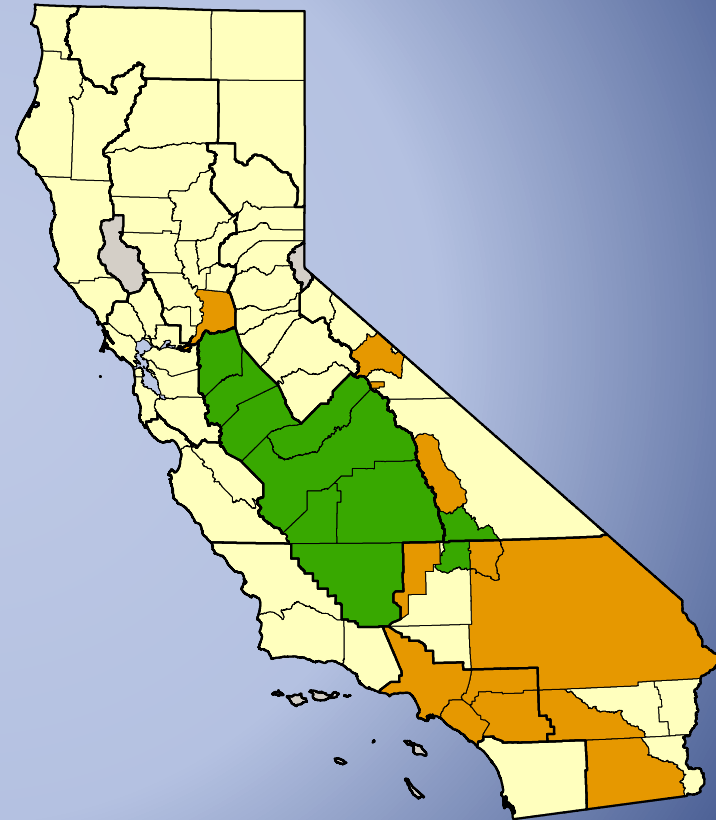
Milestone	Date
EPA promulgates 2012 PM _{2.5} NAAQS rule	December 14, 2012
Issue Designations Guidance	April 16, 2013
States and tribes submit recommendations for PM _{2.5} designations to the EPA	No later than December 13, 2013
EPA notifies states/tribes re: any intended modifications to their recommendations (120-day letters)	No later than August 14, 2014 (120 days prior to final PM _{2.5} area designations)
EPA publishes public notice of state recs and EPA's intended modifications, if any; EPA initiates 30-day public comment period	No later than August 29, 2014
End of 30-day public comment period	No later than September 29, 2014
States/tribes submit additional information to respond to EPA's modification of a recommended designation	No later than October 29, 2014
EPA promulgates final PM _{2.5} area designations	December 2014 (effective early 2015)

2011 PM₁₀ Attainment Status

State



Federal

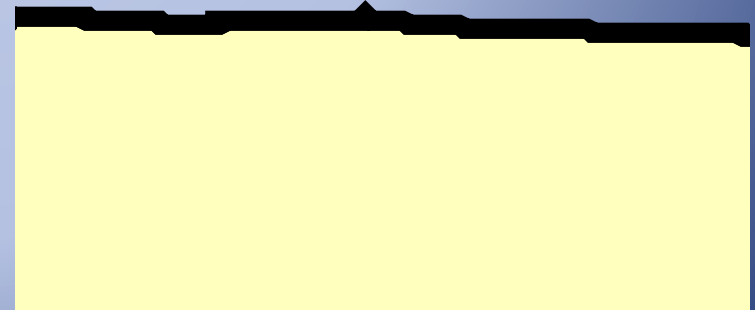
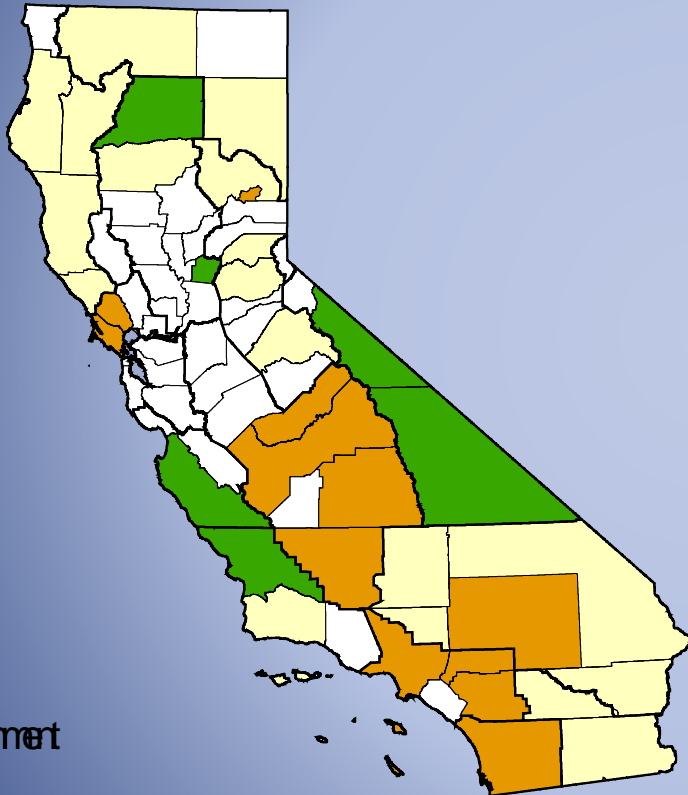






May 2011 Staff Report

2011 PM 2.5 Attainment Status

State

Federal



-  Attainment
-  Unclassified
-  Nonattainment-Transitional
-  Nonattainment

May 2011 Staff Report

California's Projected Growth

YEAR	POPULATION	REGISTERED VEHICLES	VEHICLE MILES TRAVELED
1930	6 Million	2 Million	
1940	7 Million	2.8 Million	24 Billion
1950	11 Million	4.5 Million	44.5 Billion
1960	16 Million	8 Million	71 Billion
1970	20 Million	12 Million	110 Billion
1980	24 Million	17 Million	155 Billion
1990	30 Million	23 Million	242 Billion
2000	34 Million	28.5 Million	300 Billion
2025	45 Million	40+ Million	500 Billion

PM Source	Percent of PM10/day
Unpaved Road Dust	21%
Paved Road Dust	17%
Fires	14%
Windblown Dust	12%
Non-Anthropogenic (Wildfires)	10%
Construction/Demolition	8%
Farming Operations	7%
Vehicles	6%
Stationary Industrial Sources	5%
Total	100%

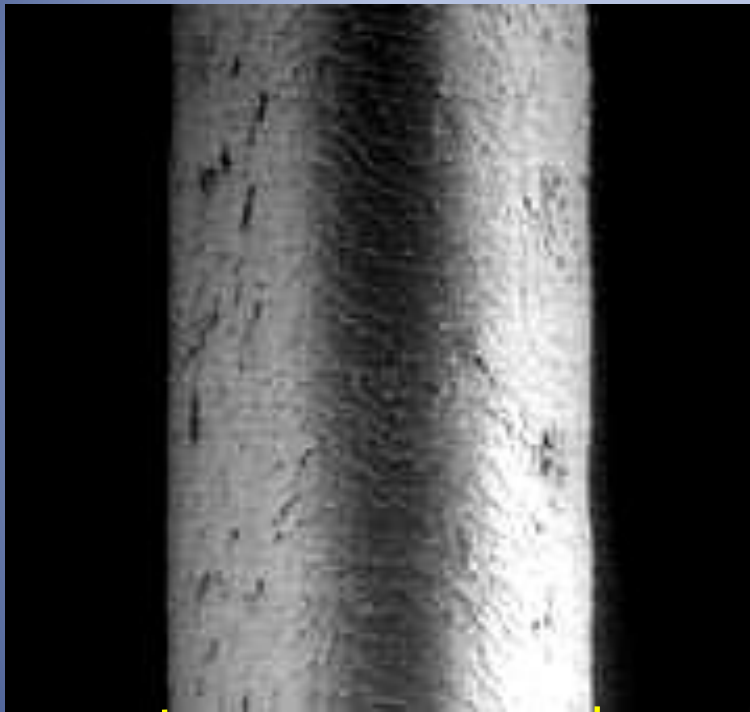
(ARB, Almanac Emissions Projection Data, 2013 Data)

Fugitive Dust and Particulate Matter (PM10)

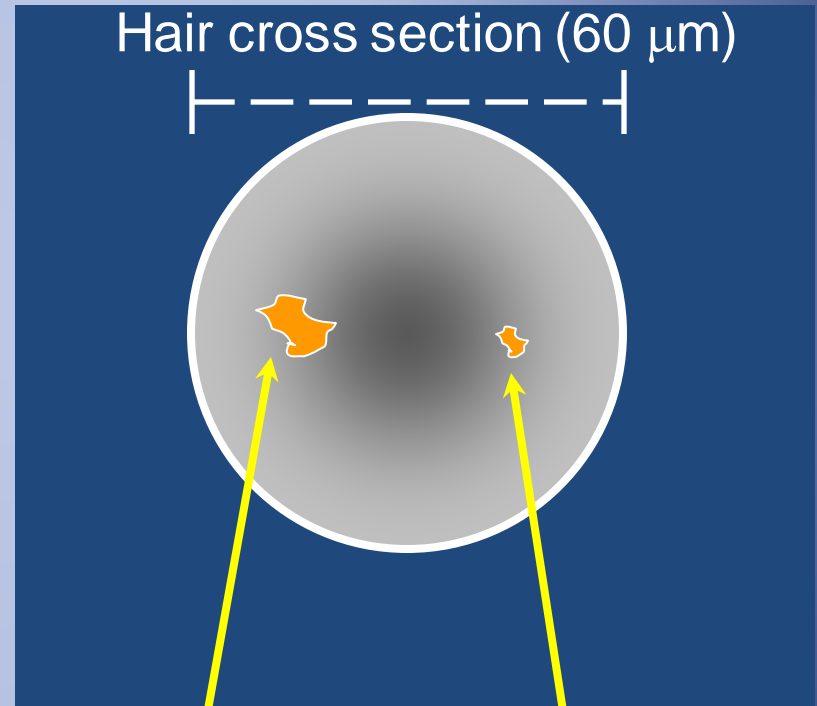


PM10

- ❖ **PM10 = particles 10 microns and smaller**
- ❖ **How small is 10 microns?**



Human Hair
(60 μm diameter)



PM10
(10 μm)

PM2.5
(2.5 μm)



HUMAN HAIR
50-70 μm
(microns) in diameter

PM_{2.5}
Combustion particles, organic
compounds, metals, etc.
< 2.5 μm (microns) in diameter

PM₁₀
Dust, pollen, mold, etc.
< 10 μm (microns) in diameter

90 μm (microns) in diameter
FINE BEACH SAND

What are particles composed of?

Heavy Metals
Sulfates
Dust
Carbon
Soot
Nitrates
Smoke
Salts
Aerosols
Organic
Soil



**Hair
Skin**

11 Microns and larger

7 to 11 Microns

Pharynx

4.7 to 7 Microns

Trachea

Primary bronchus

3.3 to 4.7 Microns

Secondary bronchi

2.1 to 3.3 Microns

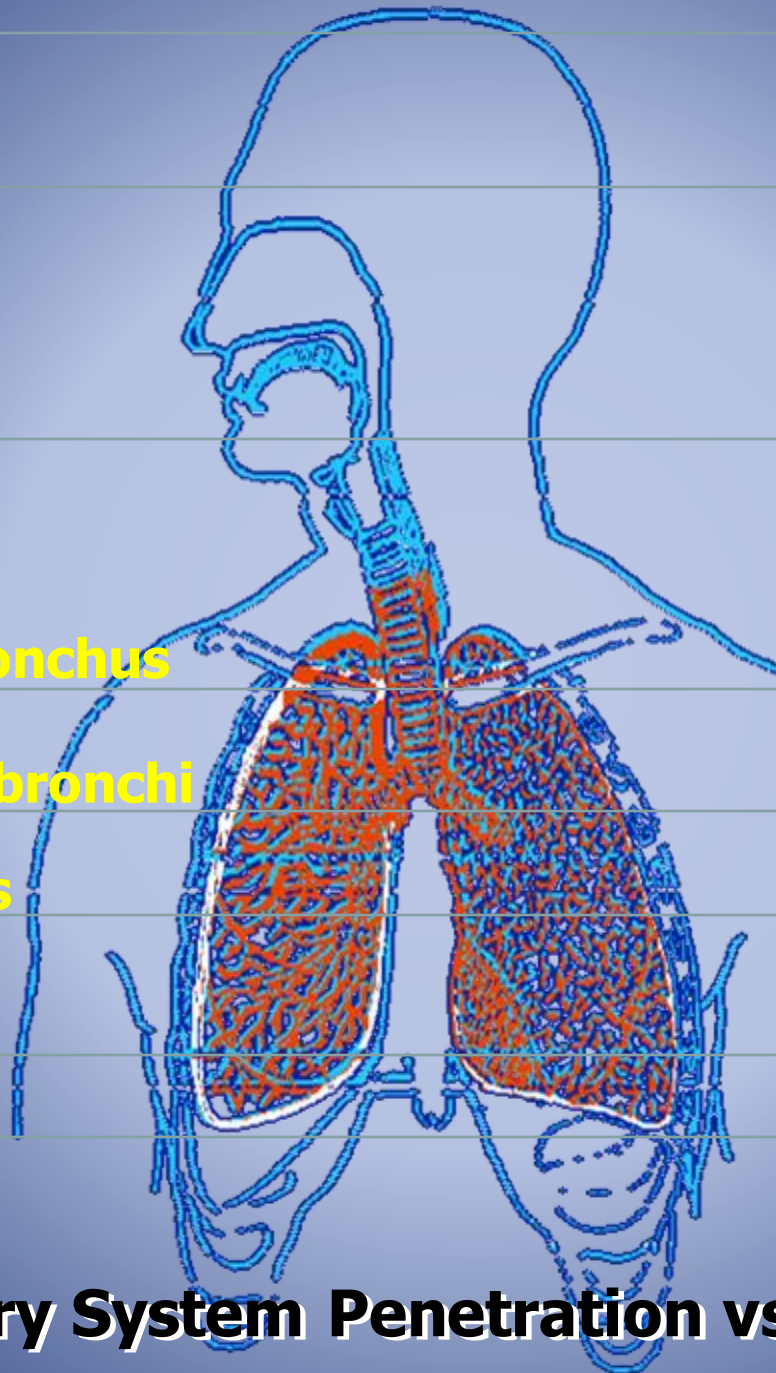
Bronchioles

1.1 to 2.1 Microns

Alveoli

0.65 to 1.1 Microns

0.43 to 0.65 Microns



Respiratory System Penetration vs. Particle Size

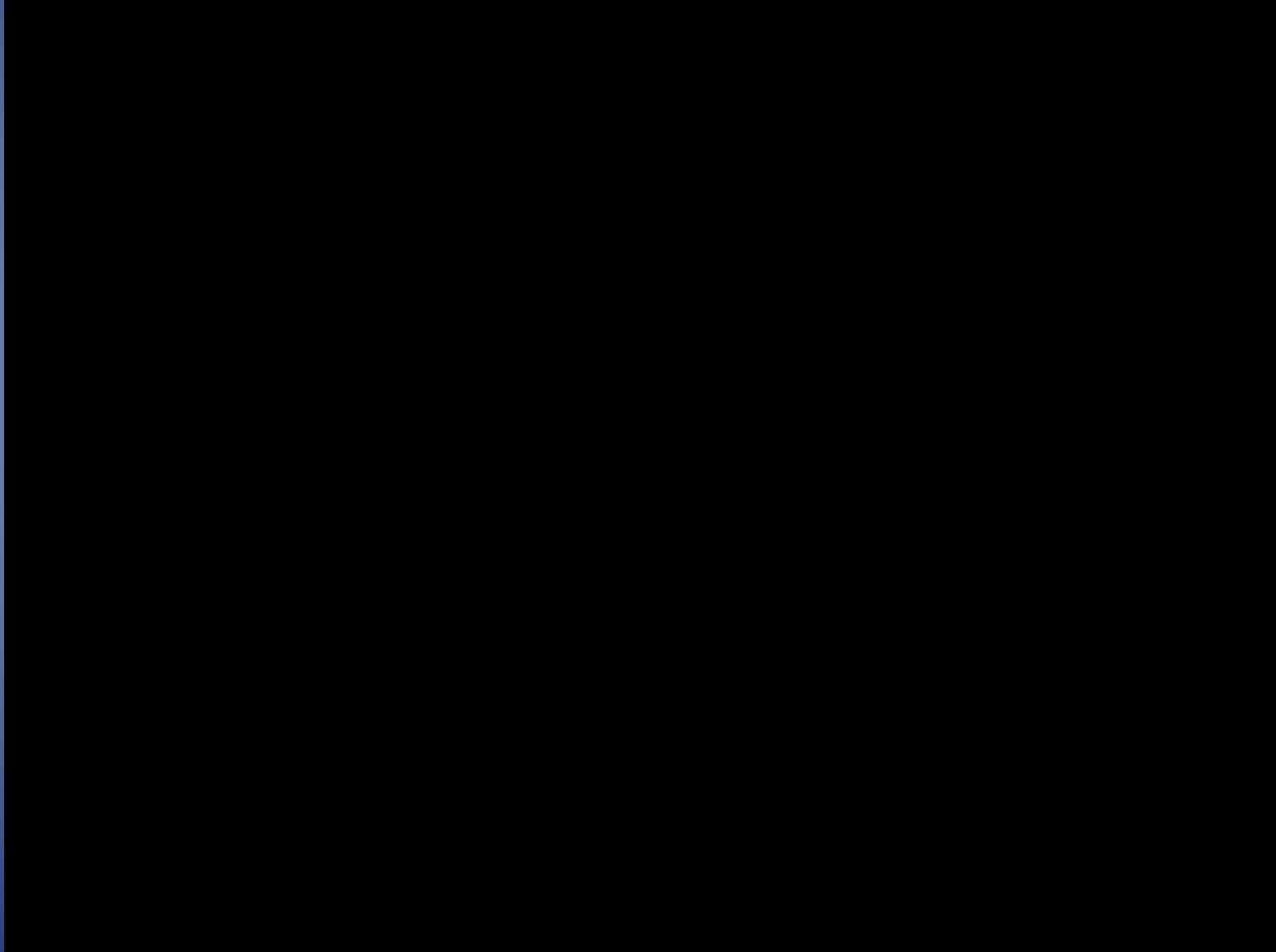
What are the Health Effects of PM Air Pollution?



- ❖ **Increases asthma attacks**
- ❖ **Reduces lung function**
- ❖ **Aggravates bronchitis**
- ❖ **Results in respiratory disease**
- ❖ **Can cause premature death**

Effects are immediate and long term

Health Effects of Diesel Exhaust



Effects of Air Pollution

- Headaches, brain damage**
- Sore throat, Stinging eyes**
- Asthma, bronchitis,
permanent lung damage**
- Reproduction problems**
- Reduced immunity, anemia,
cancer, birth defects,
premature death**

PM Takes Several Forms and Comes From Many Sources

Natural



Vacant Lots



Forest Fires



Volcanoes



Wind action



Automobiles



Industrial Sources



Wood Burning



Disturbed Soil

Man Made (Anthropogenic)



Video by

Dr. John Tatarko, USDA

District Rules Later Amended...

To avoid federal sanctions

To satisfy PM10 Plan commitments

❖ Two Basic Requirements

❖ 1. Limit “Visible Dust Emissions” (VDE)

❖ to 20% opacity

❖ 2. Maintain a Stabilized Surface on

✓ Unpaved roads

(includes the 20% opacity VDE standard)

✓ Disturbed surface areas

✓ Outdoor bulk material storage piles



Purpose of the Regulation

- **“To reduce ambient concentrations of fine particulate matter (PM₁₀) by requiring actions to prevent, reduce, or mitigate anthropogenic fugitive dust emissions.**

Fugitive Dust

- ❖ **Any solid particulate matter entrained in the ambient air which is caused by anthropogenic or natural activities which is emitted into the air without first passing through a stack or duct...**

Subject Sources

A red dump truck with a black bed is shown in the process of dumping a load of dark gravel onto a gravel driveway. The truck is positioned on the left side of the frame, and the gravel is being discharged from the right side of the bed. The background consists of a dense line of green trees. The text 'Subject Sources' is overlaid at the top in a large, bold, yellow font. Below it, a list of eight items is presented in a white, bold font, each preceded by a diamond-shaped bullet point.

- ❖ Bulk Material Storage, Handling and Transport
- ❖ Construction/Earthmoving Activities
- ❖ Demolition Activities
- ❖ Vacant Open Areas
- ❖ Paved and Unpaved Roads
- ❖ Unpaved Traffic Areas
- ❖ "Off-Field" Agricultural Sources

Construction Activity



Bulk Material Handling



Storage Piles





Statewide Rule Summary

❖ 19/35 Districts have a Fugitive Dust Rule

✓ 8/19 rules are "...crossing the property line" limitations, ONLY

✓ 5/19 rules include additional mitigation requirements

❖ 8/19 rules also include a 20% VE opacity limit

Statewide Rule Summary

❖ 7 of those 19 Districts also include additional “advanced” req’s such as:

- ✓ Dust Control Plans
- ✓ Best Available Control Measures (BACM)
- ✓ Specific Visible Emission Evaluation test methods for moving sources of dust
- ✓ Test methods that test for a “Stabilized Surface” or measure silt content



“General” Rule Limitations

a person shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates...

Nuisance

- Any activity that causes fugitive dust must not cause a nuisance



“Specific” Rule Sections

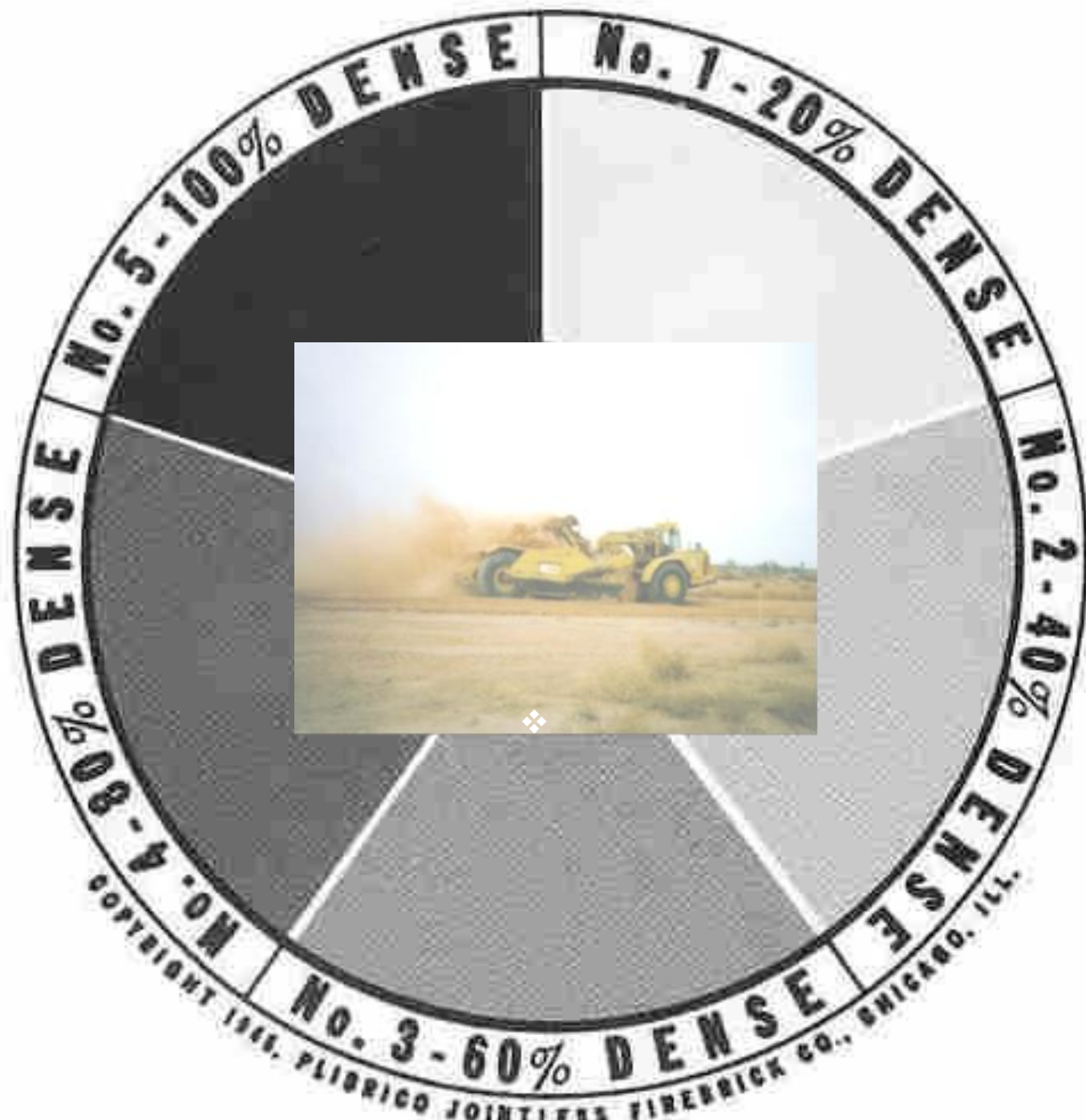
- ❖ **General Requirements**
- ❖ **Construction, Demolition, Excavation, and Other Earthmoving Activities**
- ❖ **Bulk Materials**
- ❖ **Carryout and Trackout**
- ❖ **Open Areas**
- ❖ **Paved and Unpaved Roads**
- ❖ **Unpaved Vehicle/Equip. Traffic Areas**
- ❖ **Agricultural Sources**

Two Basic Requirements

- ❖ **Limit Visible Dust Emissions (VDE)**
 - ✓ to 20% opacity-methods described in Appendix A of Rule 8011
- ❖ **Maintain a “Stabilized Surface” on:**
 - ✓ Unpaved roads
 - ✓ Disturbed surface areas
 - ✓ Outdoor bulk material storage piles

Visible Dust Emissions (VDE)

- ☐ Fugitive dust emissions that are visible to an observer
- ☐ “Opacity” is a visual evaluation of the amount of one’s view that is obscured by a dust plume
- ☐ Limit VDE to 20% opacity
- ☐ A qualified observer is tested and certified by the California Air Resources Board



Definitions

❖ Bulk Material:

✓ ...any unpackaged material with a silt content of more than 5%

❖ Silt:

✓ ...any aggregate material with a particle size of < 75 micrometers in diameter, which passes through a No. 200 sieve

Definitions

❖ Trackout:

✓ ...material that adheres to vehicle tires and is deposited onto paved public roads or their shoulders

❖ Carryout:

✓ ...materials from vehicles or trailers falls onto paved public roads or their shoulders

Definitions

❖ Vehicle Daily Trips (VDT):

- ✓ ...24-hour total count of all vehicles

❖ Annual Average Daily Vehicle Trips (AADT):

- ✓ ...annual average 24-hour total of all vehicles counted on the road



Definitions

❖ Agricultural Sources:

- ✓ ...commercial growing of crops or raising of fowl or animals

❖ Off-field Agricultural Sources:

- ✓ paved and unpaved roads
- ✓ unpaved vehicle traffic areas
- ✓ bulk material handling, storage, and transport



Fugitive Dust

Visual Determination of Opacity

- ❖ **Test Method For Unpaved Roads and Unpaved Traffic Areas**
- ❖ **Test Method For Time-Averaged Regulations**
 - ❖ **Must be qualified by the ARB as a certified VEE observer**

“Visible” vs. “Fugitive” Emissions

- ❖ **VE applies to any operation that emits visible emissions (usually through a stack)**
- ❖ **Ringelmann 1/20% opacity std.**
 - ✓ **Not > 3 minutes in an hour**
- ❖ **Fugitive Dust-EPA Method 9 N/A**
 - ✓ **few Districts use specific methods for determining Visible Dust Emissions**
 - ✓ **5% opacity std. for permitted sources with an emission from an unintended opening**

METHODS TO DETERMINE COMPLIANCE

Methods to Determine Violations

- **Federal**
 - **Method 9**
 - **Method 22**
- **Local Air Districts**
 - **Alternate Method 9**
 - **Local Test Methods**

METHOD 22

**❖ Visual Determination
of Fugitive Emissions
from Material Sources
and Smoke Emissions
from Flares**

EPA Method 9

How is Method 9 Applied to Fugitive Dust?



Method 9 for Fugitive Dust targets...

- **Fugitive dust from construction activities.**
- **Vacant lots/open space**
- **Unpaved roadways/easements**
- **Unpaved parking areas**
- **Commercial feedlots & commercial livestock areas.**

Method 9 for Fugitive Dust

- **Developed from a need for a method to evaluate visible emissions from mobile sources/equipment**
- **Why?**
 - Sources were not meeting 20% opacity standard even when they complied with work practices.**

Problems encountered in Development

- **Challenges in using Method 9 in Reading Fugitive Dust Emissions**
 - **Bubble concept**
 - **Must be one discrete, not multiple operations**
 - **Must read only in the path of activity**
 - **Must follow activity of only one vehicle**

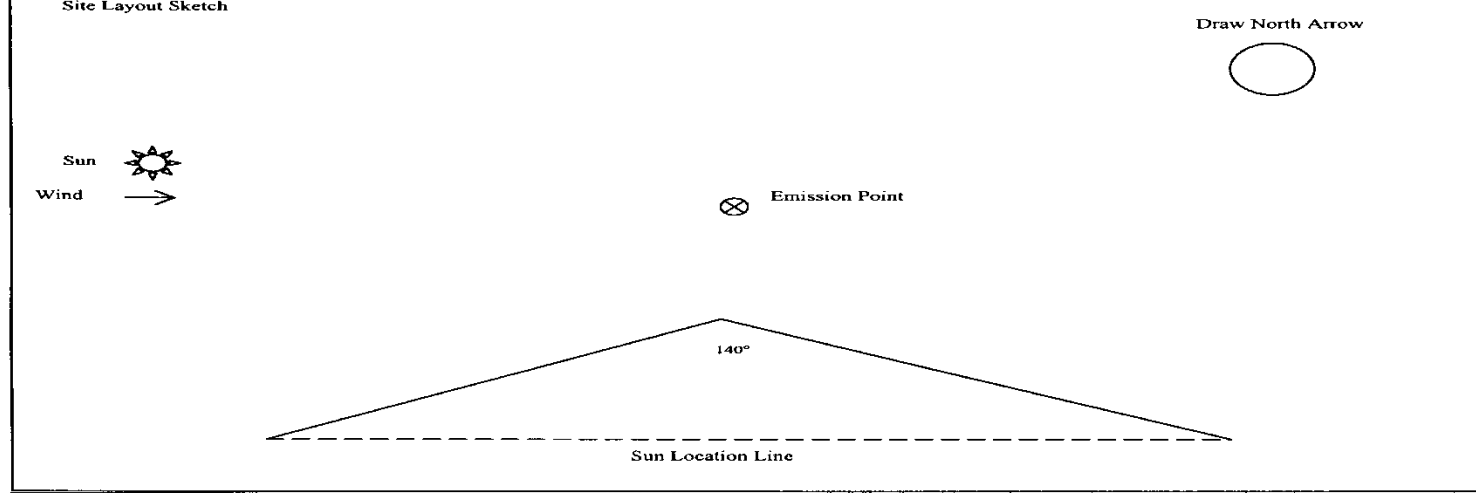
Problems, Cont.

- **Fallout zone determination**
 - **Is it Variable or set area?**
- **5 versus 10 second readings?**
- **0% reading versus a no activity reading?**



















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3. Emissions Description (continued)

 <p>1. Excavator Front Shovel</p>	 <p>2. Excavator Track Model</p>	 <p>3. Excavator Wheel Model</p>	 <p>4. Backhoe Loader</p>
 <p>5. Trencher</p>	 <p>6. Paddle Scraper</p>	 <p>7. Scraper Wheel Tractor</p>	 <p>8. Push-Pull Scraper</p>
 <p>9. Wheel Tractors</p>	 <p>10. Small Wheel Loader</p>	 <p>11. Large Wheel Loaders</p>	 <p>12. Track Loaders</p>
 <p>13. Articulated Truck</p>	 <p>14. Construction Truck</p>	 <p>15. Haul Truck Rigid Frame</p>	 <p>16. Skid Steer Loader (Bobcat)</p>

Visible Emission Observation Form (Appendix C)

(1) BACKGROUND INFORMATION

Permit #:	Date:	Start Time:	Stop Time:
Company/Permittee:			
Project Location/Address:			
City:	State:	Zip Code:	
Equipment:		Operating Mode:	
Control Equipment:		Operating Mode:	

(2) SITE CONDITIONS

Sky Conditions:	Ambient Temperature (°F):
Wind Speed (mph):	Wind Direction:

(3) EMISSIONS DESCRIPTION (complete examples on back page)

Emission Point(s):	
Emission Color:	Background Color:
Plume Length (ft):	Plume Type: <input type="checkbox"/> continuous <input type="checkbox"/> non-continuous
Fall out zone (ft):	
Distance from Observer (ft):	Direction from Observer:
Height Relative to Observer (ft):	Height Above Ground Level (ft):

(4) OPACITY READINGS (Record time interval with an 'x' to denote an interrupted reading.)

CONTINUOUS	0 seconds	10 seconds	20 seconds	30 seconds	40 seconds	50 seconds
NON-CONTINUOUS	0 seconds	5 seconds	0 seconds	5 seconds	0 seconds	5 seconds
1 minute						
2 minutes						
3 minutes						
4 minutes						
5 minutes						
6 minutes						
7 minutes						
8 minutes						
9 minutes						
10 minutes						
11 minutes						
12 minutes						

(5) OPACITY SUMMARY

Number of Readings Taken:	Average Opacity (12 consecutive readings):
Range of Opacity Readings: minimum	maximum
Number of Readings Exceeding 20% Opacity:	
Violation <input type="checkbox"/> NO <input type="checkbox"/> Yes	Violation #:

Observer's Name: _____ Signature: _____

Organization: Maricopa County Air Quality Department Date: _____

Certified by: _____ Date: _____

Method 9 for Fugitive Dust Now “Alternate Method 9”

- **2 methods adopted:**

Non-continuous dust plumes (e.g. unpaved roads and unpaved traffic areas)

Continuous dust plumes (e.g. blading operations)

Non-Continuous Dust Plumes

- **Includes vehicle traffic on unpaved roads**
- **Chose a discrete activity**
- **Readings conducted at 0 and 5 (or 10) seconds**
- **Average the highest 12 consecutive readings in one hour or less**

❖ Visual Determination ❖ of Opacity (VDE)

- **Stand at least 16.5 feet from source**
- **Stand perpendicular to wind w/ sun in 140 degree quadrant at back**
- **Read approx. 3 feet above surface where dust is being generated**
- **Two observations per vehicle, one and five seconds apart**





CVT

772



Continuous Dust Plumes

- Includes graders, trenchers, paddlewheels, blades, clearing, leveling, and raking
- Readings are done along a discrete length of path or following a single piece of equipment
- Readings at 15 second intervals
- Average each set of 12 or 24 consecutive readings.

❖ Visual Determination ❖ of Opacity (VDE)

- **Stand at least 16.5 feet from source**
- **Stand perpendicular to wind w/ sun in 140 degree quadrant at back**
- **Read approx. 3 feet above surface where dust is being generated**
- **Record observations every 15 seconds**



11 2 '01







6-2-04



DEERE

8 9'02

Test Method For Unpaved Roads And Unpaved Traffic Areas

❖ Step 1:

- ❖ At least 16.5' from Dust Source
- ❖ Sun 140° to Observer's Back
- ❖ Read Plume Perpendicular to Line of Vision
- ❖ Only One Plume at a Time



Test Method For Unpaved Roads And Unpaved Traffic Areas

- ❖ **Step 2: Record Pertinent Data**
 - ❖ **Location & Type of Source**
 - ❖ **Observer's Name & VEE Cert Date**
 - ❖ **Sketch of Site**
 - ❖ **Time & Distance from Plume**
 - ❖ **Wind Speed**
 - ❖ **Color & Type of Background**

Test Method For Unpaved Roads And Unpaved Traffic Areas

❖ Step 3:

- ❖ Observe Plume Approx. 1 Meter Above it's Generation Point
- ❖ Make Two Observations/Vehicle
 - ✓ At "0" Seconds & "5" Seconds
- ❖ Don't Read Plume Continuously

Test Method For Unpaved Roads And Unpaved Traffic Areas



**Read this spot twice, every 5
seconds, for six vehicles**

Test Method For Unpaved Roads And Unpaved Traffic Areas



- ❖ Step 4:
 - ❖ Record Opacity to Nearest 5%
 - ❖ Estimate Size of Vehicles
("Mid-Size Passenger", "Heavy-Duty Truck")
 - ❖ Estimate Speed of Vehicles

Test Method For Unpaved Roads And Unpaved Traffic Areas



Test Method For Unpaved Roads And Unpaved Traffic Areas

❖ Step 5:

**❖ Repeat Step 3 (Observation) until
12 Consecutive Readings**

(Six Vehicles Have Driven on Source)

❖ Period Must Not Exceed 1 Hour

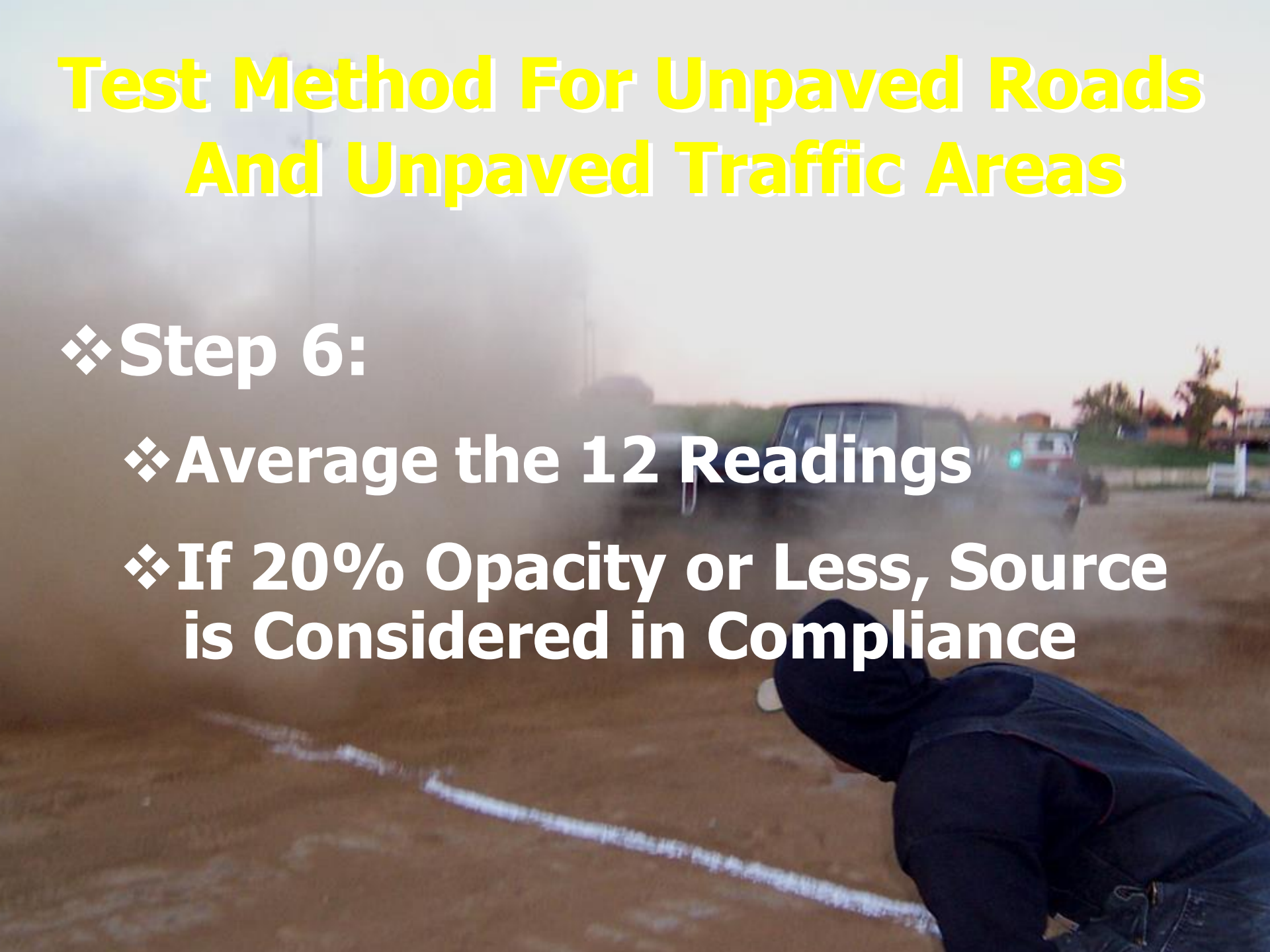


Test Method For Unpaved Roads And Unpaved Traffic Areas

❖ Step 6:

❖ Average the 12 Readings

❖ If 20% Opacity or Less, Source is Considered in Compliance



Test Method For Unpaved Roads And Unpaved Traffic Areas



**Is this applicable to the
VDE Test Method?**

Test Method For Visual Determination Of Opacity Of Emissions From Sources For Time-Averaged Regulations

- **Applicable where visible emission data must be averaged over a specific time period to determine compliance**



Time-Averaged Regulated Sources

- Observer: Currently Certified by ARB
 - ❖ at least 5 meters from source
 - ❖ sun in 140° sector behind back
 - ❖ contrasting background
 - ❖ line of sight perpendicular to plume
 - ❖ may follow dust plume created by mobile earthmoving equipment

Time-Averaged Regulated Sources

❖ Record Pertinent Data

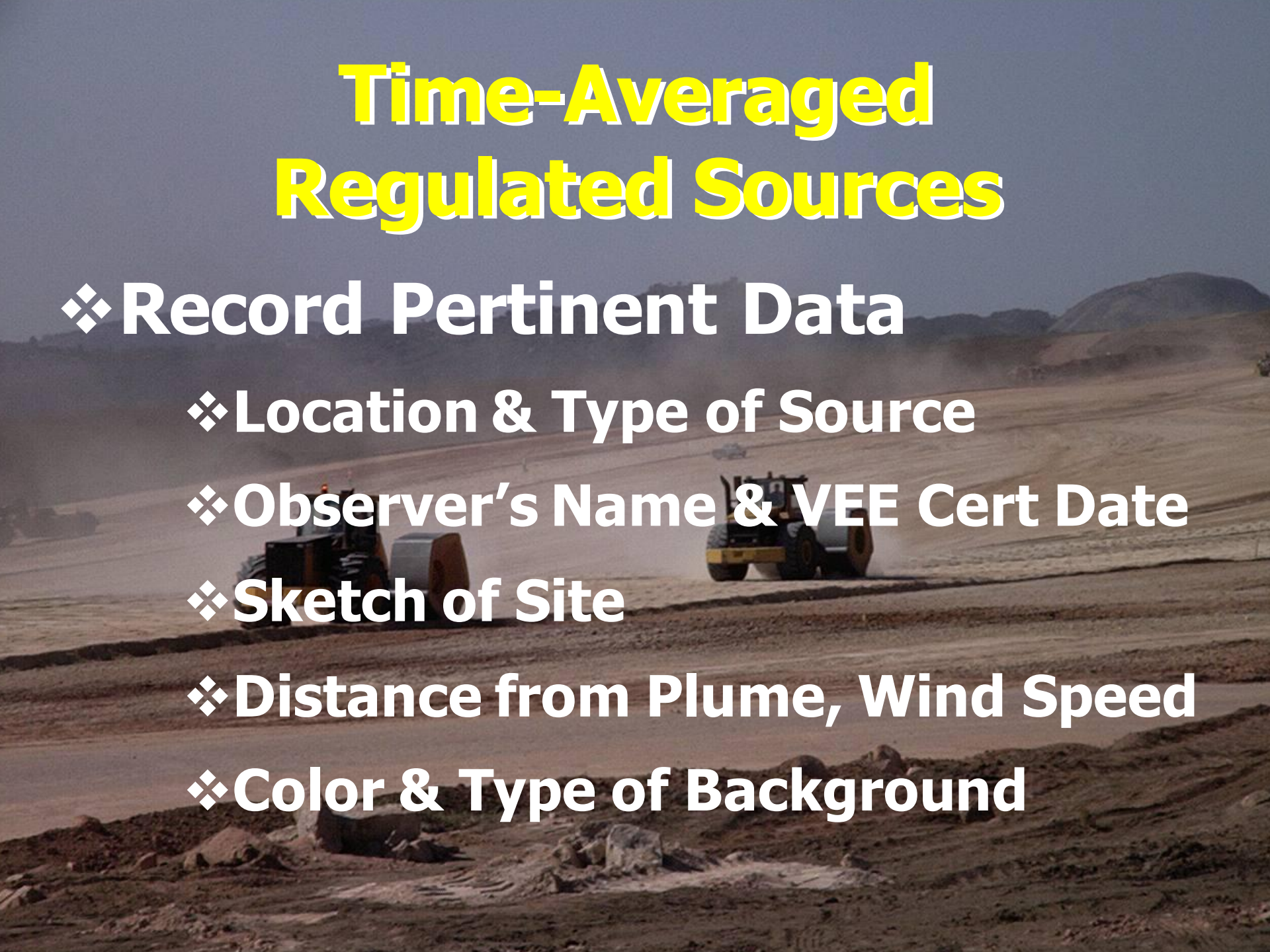
❖ Location & Type of Source

❖ Observer's Name & VEE Cert Date

❖ Sketch of Site

❖ Distance from Plume, Wind Speed

❖ Color & Type of Background



Time-Averaged Regulated Sources

A large yellow mining truck, model 530M, is shown in an open-pit mine. The truck is carrying a large load of dark, rocky material in its bed. The background shows a clear blue sky and a dirt-covered ground. The truck is positioned in the center-right of the frame, with its front facing left. The text is overlaid on the image.

- **Make Observations 1 meter above:**
 - ❖ **surface of storage piles**
 - ❖ **rim of open-pit mining**
 - ❖ **equipment Generating Plume**
- **readings at 15-second intervals**
- **record to nearest 5% opacity**
- **12 or 24 consecutive readings**
 - ❖ **Mark an "X" if Plume Travels too far or Ceases**

Time-Averaged Regulated Sources

- **Compliance Determination:**
 - ❖ **Average 12 or 24 consecutive readings**
 - ❖ **If 20% or lower, source is in compliance**
 - ❖ **Two Sets of Readings Shall Not Overlap**

READY TO
BREW

LEFT
WARMER

RIGHT
WARMER

REAR
WARMER



BREAK TIME



CAUTION-HOT



DUST CONTROL MEASURES

Programs and Practices

- ❖ **SJVUAPCD Requires any “Key” Representative of the Project to Complete a Dust Control Training Course and Receive a Certificate**
- ❖ **ARB (SB656) List of Measures**

Programs and Practices

A blue agricultural sprayer truck is shown in a field, spraying a fine mist of liquid. The truck has a large tank and multiple nozzles. The background is a clear blue sky and a flat, open landscape.

- ❖ **Best Available Control Measures (BACM)**
 - ❖ **Applied to Significant Source Categories**
- ❖ **Conservation Management Practices (CMP)- “Agricultural Operations”**
- ❖ **Carl Moyer Memorial Air Quality Standards Attainment Program**
 - ✓ **Recently Extended its Uses to Non-Engine Sources Of Air Pollution Where Reductions are Real, Quantifiable, and Enforceable**



Control Measures

- **Water**
- **Dust Palliatives**
- **Aggregate**
- **Pavement**
- **Vegetative Controls**
- **Restricting Vehicle Access**
- **Reducing Vehicle Speed**
- **Wind Barriers**
- **Carryout/Trackout Prevention**



WATER

Benefits of Using Water

- **Many available water sources**
 - Fire Hydrants
 - Storage Tanks
 - Wells
 - Ponds, canals, lakes, and streams
- **Easily applied and re-applied**
 - Sprinklers
 - Water trucks, wagons, and trailers
 - Hoses



Foaming Products

A photograph showing a person in a green shirt and blue shorts using a high-pressure water spray to clean a large wooden building. The spray creates a thick white foam on the ground. To the left, a white truck with a large tank is visible. The scene is set outdoors under a clear blue sky.

Water and a special blend of surfactant creates a foam that increases wetting efficiency

Benefits of Using Water

A white water truck with a large cylindrical tank is driving on a dirt road, spraying water from nozzles on the sides. The truck has "ENVIROCON, INC." written on the side. The background shows a chain-link fence, trees, and a house under an overcast sky.

- **Reduces the silt content**
 - Increases soil moisture content and causes particles to conglomerate
 - Reduces the tendency for particles to become airborne
- **Effective in reducing PM10 emissions**
 - UC Davis Study reports an average of $87\% \pm 6\%$ PM10 reduction when water is applied to an unpaved road

Benefits of Using Water

A white water tanker truck is shown from a rear-quarter perspective, spraying a wide, misty stream of water onto a dirt road. The truck is positioned on the right side of the frame. In the background, there are several large, tan-colored storage containers or trailers, a palm tree, and a clear blue sky. The ground is dry and dusty, with some water puddles visible where the truck has passed.

- **Effective control on a variety of sources**
 - Active and inactive open areas
 - Trenching and earthmoving activities
 - Unpaved roads and traffic areas
 - Bulk material handling and storage
 - Structure demolitions
 - Preventing trackout
- **Low environmental impacts**

Limitations of Using Water



❖ Evaporation

- ✓ Ambient and surface temperatures
- ✓ Humidity
- ✓ Wind speed and direction
- ✓ Amount and frequency of water applied
- ✓ Vehicle type, speed, weight, etc.

❖ Potential environmental concerns

- ✓ Other agency req's and prohibitions
- ✓ Water contamination

Limitations of Using Water

- **Application costs**
 - *Generally* is expensive and labor intensive
 - Availability of equipment and resources
 - Someone to monitor the site
- **Condition of treated surfaces**
 - Hydrophobic vs. hydrophilic soils
 - Compaction
 - Materials may be damaged by water
- **Areas with limited access to water**
- **Trackout due to over-watering**



Regulation Conflicts Using Water




“Wattles”



Dust Palliatives

- ❖ **Basic Categories: (Besides Water)**
 - ❖ **Water Absorbing Products**
 - ❖ **Petroleum Based Products**
 - ❖ **Organic Non-Petroleum Based Products**
 - ❖ **Electrochemical Products**
 - ❖ **Polymer Products**
 - ❖ **Clay Additive Products**

Benefits of Using Palliatives

- **PM10 control efficiency**
 - Many products achieved 99% PM10 control when initially applied
 - Many products maintain at least 50% PM10 control for up to a year after initial application
 - **Can be Air Resources Board certified**
 - **Application costs**
 - Depends on the product, how its applied, and the frequency of reapplications
 - Long term costs – generally less than water
 - **Continued reapplication of petroleum emulsions or road oils may eventually qualify the surface as a paved surface**
- 

Limitations

A person in a dark shirt and pants is operating a white road salt spreader on a gravel road. The spreader is a large, cylindrical vehicle with a hopper on top and a spreading mechanism at the bottom. The person is standing to the left of the spreader, facing it. The background shows a clear blue sky, a wooden fence, and a building in the distance.

- **Not a permanent solution**
 - Requires further applications
- **Does not work with active earthmoving**
- **Hygroscopic (Road Salts)**
 - Control efficiency is dependant on the concentration applied to the surface and the relative humidity
 - Potential to be depleted by precipitation and runoff due to high solubility





Aggregate
(Non-Erodible Materials)

Benefits of Using Aggregate

- **Includes washed gravel or recycled asphalt**
- **Effective with unpaved surfaces and controlling trackout**
- **Less Expensive Than Paving**
- **Provides long-term control**
- **Readily available**
- **Easily applied and re-applied**

Limitations of Using Aggregate

- **May be ineffective in limiting VDE**
 - Depends on vehicle types and speed
 - Gravel depth and size
 - Surface condition of the treated road
- **May be ineffective in reducing PM10**
 - Only slightly lower emissions from a “well used” gravel road than from the untreated surface.
- **Potential damage to property**
 - Flying objects...







Paving

Benefits of Paving

- **Provides excellent PM10 control**
- **Provides long-term control**
 - **Long duration between application and re-application**
- **Best control for high traffic areas**
- **May be used for preventing trackout**
- **Minimizes Potential Pollutants into Storm Drains**

Limitations

A photograph of a paved road winding through a wooded area. The road is in the foreground, leading into the distance. There are trees on both sides, and a utility pole is visible on the right side. The sky is blue with some clouds.

- **Costs**

- **Must consider the amount of traffic, vehicle speeds, number of lanes and types of vehicles**

Limitations

- **Requires periodic maintenance**
 - Preventative controls for trackout and carryout.
 - Mitigation controls, such as frequent street cleaning



**Can be entrained during
windy conditions**



Vegetation

A wide-angle photograph of a lush green field of tall grass. In the background, there is a line of trees and several buildings, including a white building with a sign on its roof. The sky is clear and blue.

Types of Vegetation Control

- Re-establishing vegetation cover
 - Sprayed-on products
 - Cellulose-type
 - Hydro-seeding
 - Rice straw or hay
 - Shredded or Bales
 - Mulch
 - Wood chips
- 

Benefits of Vegetation

- **Increases surface stability**
- **Many products provide immediate control of open areas**
- **Can be effective reducing soil erosion**
- **Easily maintained**
 - **Stubble and materials left from mowing can be effective with maintaining surface stability and limiting VDE**

Limitations of Vegetation

- Difficulties with re-vegetating open areas
 - Season, soil condition, veg. type
- Treated areas require sites to remain inactive
- Most materials applied on unpaved roads and traffic areas do not hold up under continuous traffic use



Limitations of Vegetation

- ❖ **Application equipment may be a source of visible emissions**
- ❖ **Unmanaged vegetation may increase the risk of causing a fire**
 - ✓ **Disked soils significantly reduces vegetation cover and soil stability**
 - ✓ **Mowing or disking equipment may be a source of VDE**

Restricting Access



CENTER
LANE
ONLY







NATIONAL
PORT-A-FENCE
800-221-6875

GLOVER



THE HOME DEPOT
Call Steve @ 408-476-4766

CHECK INTO CASE

WIM H. JEWELERS

SUBWAY

Car Wash
Exit





Reducing Vehicle Speed

- **Posting speed limit signs along unpaved roads**
- **Studies report reduced PM10 emissions**
 - UC Davis Study (1994),**
 - ✓ **Speed reduction from 25 MPH to 10 MPH resulted in a 58% reduction in PM10 emissions**
 - ✓ **Speed reduction from 25 MPH to 15 MPH resulted in a 42% reduction in PM10 emissions**



General Requirements

- Signs must meet State and Federal DOT stds
- 15 MPH maximum speed limit for access and haul roads at construction sites
 - Posted at the entrance and every 500 feet
 - Readable in both directions
- 25 MPH max speed limit for unpaved roads
 - One posted per mile in each direction
 - ...per two miles in rural areas



Signs

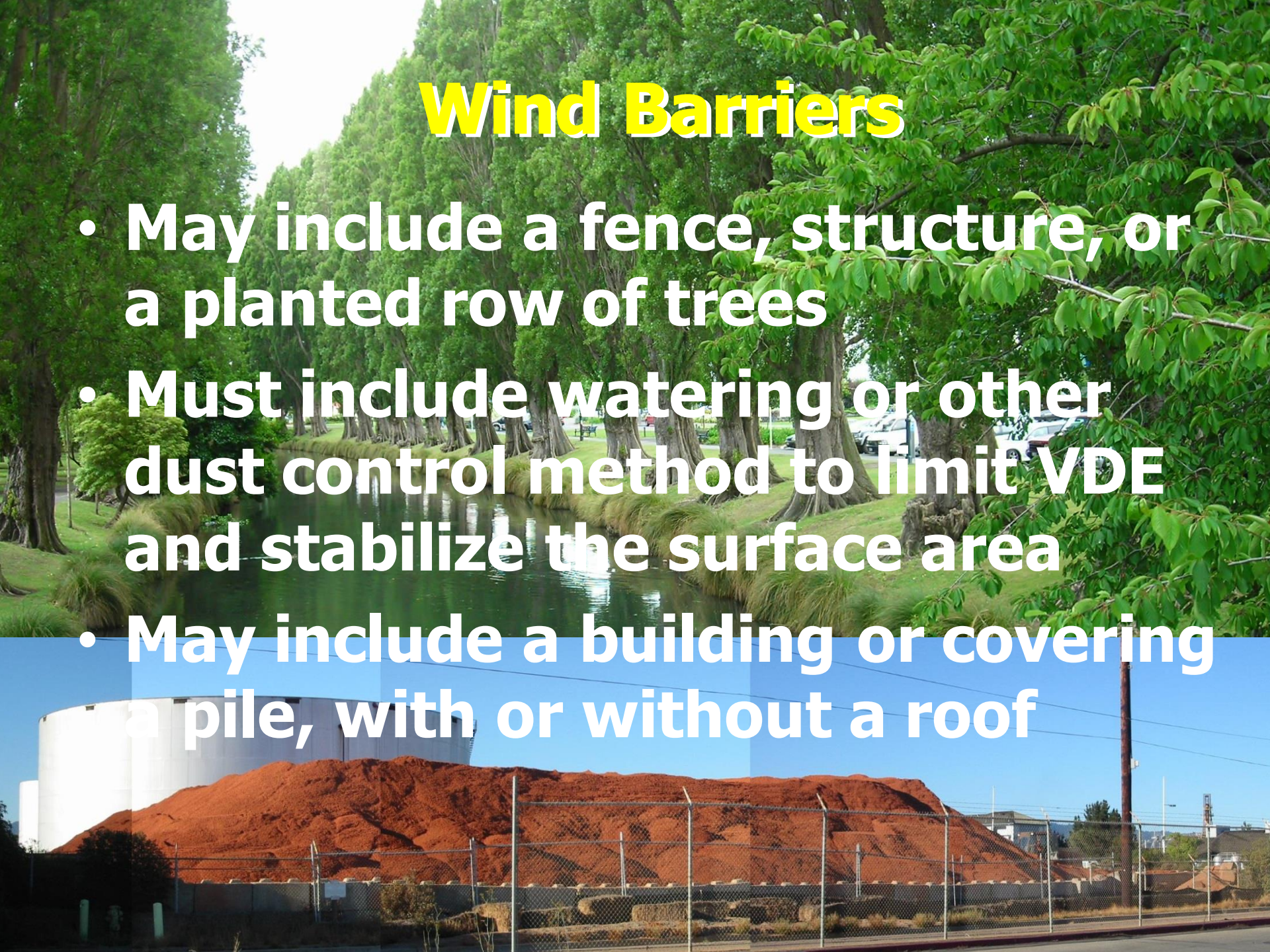


Wind Barriers



Wind Barriers

- May include a fence, structure, or a planted row of trees
- Must include watering or other dust control method to limit VDE and stabilize the surface area
- May include a building or covering a pile, with or without a roof







Carryout and Trackout





Is this in compliance?

How about these?





LEFT
TURN
ONLY

0168









Gravel Pad Requirements

- **One inch or greater in diameter**
- **At least three inches deep**
- **Extend from the paved public road surface at least 50 feet**
- **Cover the full width of the exit surface for at least 50 feet**
- **Gravel pad clean-up frequency**
 - **At the end of the work day**
 - **Following the last vehicle**
 - **Once every 24-hours**

Grizzly Requirements



- Extend at least 25 feet from paved public road
- Cover the full width of the exit surface for at least 25 feet
- A grizzly is often used in conjunction with gravel pads



Are these in compliance?







Wheel Wash Systems



PM10 Sweeper?



READY TO
BREW

LEFT
WARMER

RIGHT
WARMER

REAR
WARMER



BREAK TIME



CAUTION-HOT



Sydney



Oslo

A large, powerful explosion is taking place in a flat, arid desert landscape. A massive, billowing cloud of brown dust and smoke rises vertically from the point of impact, dominating the center of the frame. In the background, a range of rugged, grey mountains stretches across the horizon under a clear, pale blue sky. The foreground is a wide, flat expanse of dry, light-brown earth. The overall scene conveys a sense of immense power and destruction.

Your State Rule

- ❖ 7011.0150 PREVENTING PARTICULATE MATTER FROM BECOMING AIRBORNE.
- ❖ No person shall cause or permit the handling, use, transporting, or storage of any material in a manner which may allow avoidable amounts of particulate matter to become airborne.
- ❖ No person shall cause or permit a building or its appurtenances or a road, or a driveway, or an open area to be constructed, used, repaired, or demolished without applying all such reasonable measures as may be required to prevent particulate matter from becoming airborne. All persons shall take **reasonable precautions** to prevent the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate. The **commissioner may require such reasonable measures** as may be necessary to prevent particulate matter from becoming airborne including, but not limited to, paving or frequent clearing of roads, driveways, and parking lots; application of dust-free surfaces; application of water; and the planting and maintenance of vegetative ground cover.

Example of an “advanced” Air District Fugitive Dust Rule

A black wheel loader is shown in the process of dumping its load into the back of a dark-colored truck. A large, billowing cloud of dust is being kicked up from the truck's bed, partially obscuring the truck and the loader. The scene is set in an open, dusty area under a clear blue sky. In the background, there are some trees and a low wall.

**San Joaquin Valley Unified
Air Pollution Control District**

Regulation VIII Prohibitory Rules

Rule 8011 GENERAL REQUIREMENTS

**Rule 8021 CONSTRUCTION, EXCAVATION, EXTRACTION AND
OTHER EARTH MOVING ACTIVITIES**

Rule 8031 BULK MATERIALS

Rule 8041 CARRYOUT AND TRACKOUT

Rule 8051 OPEN AREAS

Rule 8061 PAVED AND UNPAVED ROADS

Rule 8071 UNPAVED VEHICLE/EQUIPMENT TRAFFIC AREAS

Rule 8081 AGRICULTURAL SOURCES

Rule 3135 DUST CONTROL PLAN FEE

San Joaquin Valley Air Basin

San Joaquin

Stanislaus

Merced

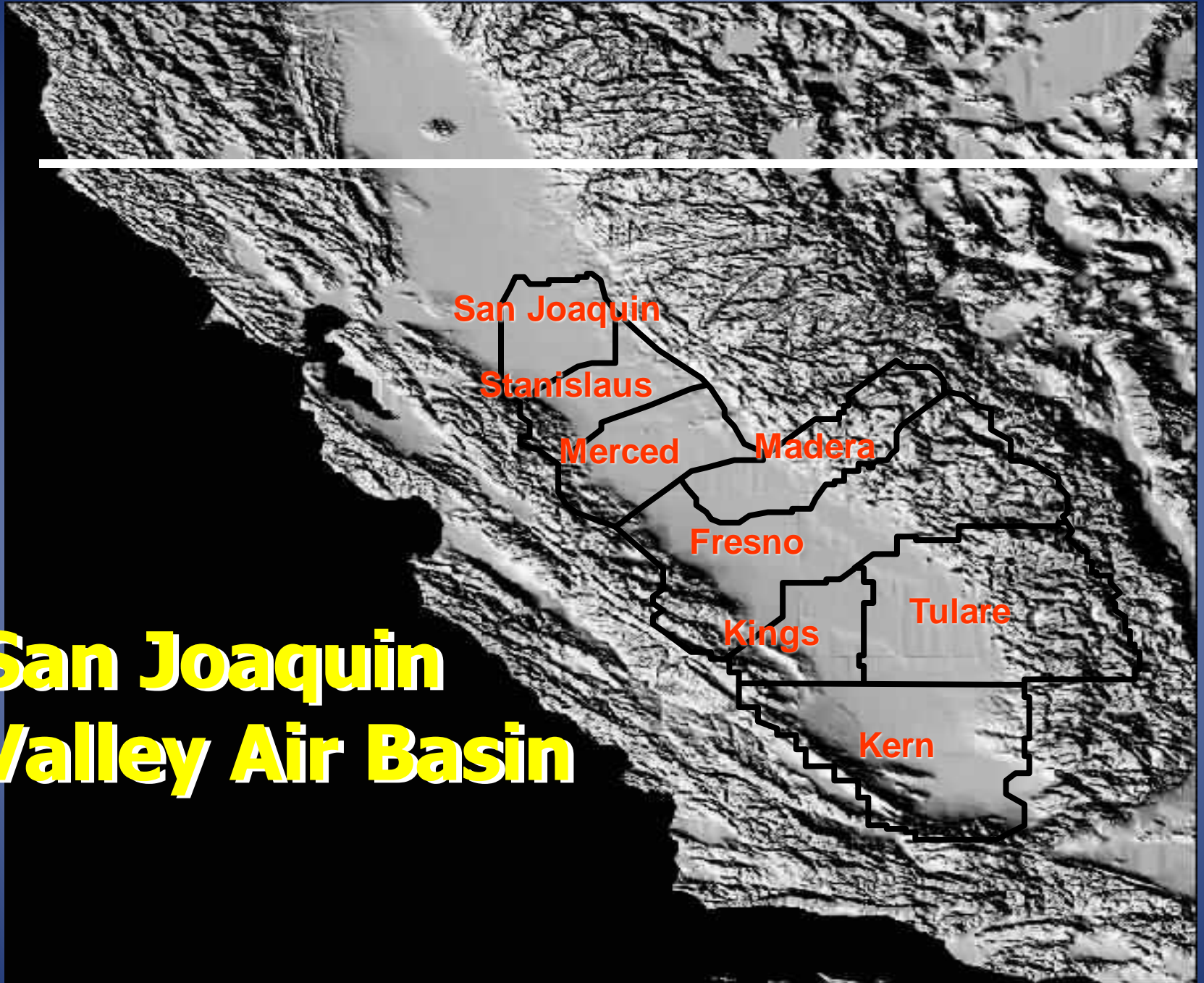
Madera

Fresno

Kings

Tulare

Kern



Rule 8011

GENERAL REQUIREMENTS

- ❖ Purpose
- ❖ Applicability
- ❖ Definitions
- ❖ General Requirements
- ❖ Test Methods
- ❖ Record keeping
- ❖ Fugitive Dust Management Plan

Rule 8011

❖ Purpose:

✓ ...to reduce ambient concentrations of fine particulate matter (PM10) by requiring actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions

❖ Applicability:

✓ ...to specified outdoor fugitive dust sources



Requirement of Rule 8021

- **Identifies the fugitive dust sources and describes the control measures that will be implemented**
- **Residential developments of 10 or more acres of disturbed surface area**
- **Non-residential developments of 5 or more acres of disturbed surface area**
- **Relocation of more than 2,500 cubic yards per day of materials on at least three days of the project**

Rules 8031-8081

❖ Additional Requirements in Rules...

✓ 8031: BULK MATERIALS

✓ 8041: CARRYOUT AND TRACKOUT

✓ 8051: OPEN AREAS

✓ 8061: PAVED AND UNPAVED ROADS

✓ 8071: UNPAVED TRAFFIC AREAS

✓ 8081: AGRICULTURAL SOURCES

Examples of Exemptions

- ❖ Permitted Blasting Activities
- ❖ Activities above 3,000 feet elevation
- ❖ Remodeling Existing Buildings by Not > 50% or 10,000 FT²
- ❖ Single Family Residences
- ❖ Government Agencies Disking Weeds for Fire Prevention
- ❖ Agricultural Sources
- ❖ Spreading of Landfill Daily Cover



Dust Control Plan

Dust Control Plan



- **Section 1: General Information**
- **Section 2: Plot Plan**
- **Section 3: Fugitive PM10 Sources**
- **Section 4: Dust Control Methods**
- **Section 5: Carryout and Trackout**
- **Section 6: Certification**

Practical Exercise

Dust Control Plan
Section 1 – General Information – Page 1

1-A Project Name and Location	
Project Name: _____	
Project Address: _____	
Major X-Streets: _____	
City: _____	County: _____
Section(s): _____	Township: _____ Range: _____
Expected Construction Start Date: _____	End Date: _____

1-B Contacts	
Report the names, addresses, and phone numbers of persons and owners or operators responsible for the preparation, submittal, and implementation of the Dust Control Plan and responsible for the dust generating operation and dust control applications. (Rule 8021 Sec. 6.3.6.1)	
Property Owner: _____	
Address: _____	
City / State / Zip: _____	
Phone: _____	Fax: _____
Developer: _____	
Address: _____	
City / State / Zip: _____	
Contact Person: _____	
Phone: _____	Fax: _____
General Contractor: _____	
Address: _____	
City / State / Zip: _____	
Contact Person: _____	
Phone: _____	Fax: _____
This Dust Control Plan was prepared by:	
Name: _____	
Title: _____	
Company Name: _____	
Address: _____	
City / State / Zip: _____	
Phone: _____	Fax: _____
Date training completed: _____	Training Location: _____

Source of Fugitive Dust Residential Sub-development



Limit VDE to 20% Opacity

- Handling
 - Storage
 - On-site transport
 - Off-site transport
 - Transport via chute or conveyor
- 

Section 1 – General Information – Page 2

Project Name: _____

1-C Contractors

Provide the names, addresses, and phone numbers of the contractors involved in dust generating activities or performing dust control as part of this project. (Rule 8021 Sec. 6.3.6.1)

1. _____

2. _____

3. _____

4. _____

5. _____

1-D Who will have the primary responsibility for implementing this Dust Control Plan? (Rule 8021 Sec 6.3.6.1)

- Property Owner Developer General / Prime Contractor
 Sub-Contractor(s) Other: _____

Primary Project Contact: _____

Title: _____

Company Name: _____

Address: _____

City / State / Zip: _____

On-Site Phone: _____ Fax: _____

Mobile Phone: _____ Pager: _____

1-E Provide a brief description of the Project's Operations.

Dust Control Plan
Section 2 – Plot Plan – Page 1

Project Name: _____

2-A Plot Plan

A plot plan identifies the type and location of each project. Attach appropriately sized maps with the project boundaries outlined or use the space in sections 2-B or 2-C to draw a plot plan. Attached maps may include tract maps, site maps, and topographic maps. Use the checklist below to make sure all areas have been identified on the plot plan. (Rule 8021 Sec. 6.3.6.2 & 6.3.6.5)

Identify the relative locations of actual and potential sources of fugitive dust emissions.

- Bulk material handling and storage areas.
- Paved and unpaved access roads, haul roads, traffic areas, and equipment storage yards.
- Exit points where carryout and trackout onto paved public roads may occur.
- Water supply locations if water application will be used for controlling visible dust emissions.

Identify the relative locations of sensitive receptors within ¼ mile of the project. (Rule 4102 Sec. 4.1)

- No sensitive receptors within ¼ mile of the project.
- Residential areas, schools, day care, churches, hospitals, nursing facilities, commercial, retail, etc.
- Freeways, roads, or traffic areas that may be affected by the dust generating activities.
- Other: _____

2-B Draw Plot Plan (if one is not attached)

May use the back of this form
Include a North Arrow

Plot plan is attached (Skip to 3-A).

Bulk Material Handling



Dust Control Plan
Section 3 – Fugitive PM10 Sources – Page 1

Project Name: _____

3-A Disturbed Surface Area

Report the total area of land surface to be disturbed, the daily throughput volume of earthmoving in cubic yards, and the total area in acres of the entire project site. (Rule 8021 Sec. 6.3.6.3)

Total area of land surface to be disturbed: _____ Acres
Daily maximum throughput volume of earthmoving: _____ Cubic Yards
Daily average throughput volume of earthmoving: _____ Cubic Yards
Total area of entire project site: _____ Acres
Total disturbed areas that will be left inactive for more than seven days: _____ Acres

3-B Dust Generating Activity Dates

The expected start and completion dates of **dust generating activities and soil disturbance activities** to be performed on site. For phased projects, it may be necessary to report expected start and completion dates separately. (Rule 8021 Sec. 6.3.6.4)

Expected start date: _____	Completion Date: _____
Phase Project Start – A: _____	Completion – A: _____
Phase Project Start – B: _____	Completion – B: _____
Phase Project Start – C: _____	Completion – C: _____

3-C Other Locations

Identify whether any other locations should be included with this plan that are involved with this project. An example may include listing any site where materials will be imported from or exported to. (Rule 8021 Sec. 6.3.2)

No other locations are included with this project. (Skip to 3-D)

Location 1: _____

No Dust Control Plan Required Included with this plan Included with another plan

Location 2: _____

No Dust Control Plan Required Included with this plan Included with another plan

Location 3: _____

No Dust Control Plan Required Included with this plan Included with another plan

Project Name: _____

3-D Sources of Fugitive Dust

This section describes the minimum requirements for limiting visible dust emissions from activities that cause fugitive dust emissions. (Rule 8021 Sec. 6.3.6.5) **Check at least one box under each category.**

Structural Demolition. (Rule 8021 Sec. 5.1, 6.3.3, & 6.3.6.5)

- No demolitions are planned for this project.
- Asbestos NESHAP notification and fees have been submitted to the District. (Rule 3050 and Rule 4002).
- Water will be applied to the following areas for the duration of the demolition activities:
 - Building exterior surfaces;
 - Unpaved surface areas where equipment will operate;
 - Razed building materials; and
 - Water or dust suppressants will be applied to unpaved surface areas within 100 feet of structure during demolition.

Pre-Activity. (Rule 8021 Sec. 5.2)

- Not applicable for this project (Please explain why in Section 3-F).
- The site will be pre-watered and work will be phased to reduce the amount of disturbed surface area at any one time (Complete Section 4-A).

Active Operations. (Rule 8021 Sec. 5.2)

- Water will be applied to dry areas during leveling, grading, trenching, and earthmoving activities (Complete Section 4-A).
- Wind barriers will be constructed and maintained, and water or dust suppressants will be applied to the disturbed surface areas (Complete Sections 4-A or 4-B, and 4-C).

Inactive Operations, including after work hours, weekends, and holidays. (Rule 8021 Sec. 5.2)

- Not applicable for this project (Please explain why in Section 3-F).
- Water or dust suppressants will be applied on disturbed surface areas to form a visible crust, and vehicle access will be restricted to maintain the visible crust. (Complete Section 4-A or 4-B, and 4-C)

Temporary stabilization of areas that remain unused for seven or more days. (Rule 8021 Sec. 5.2)

- Not applicable for this project (Please explain why in Section 3-F)
- Vehicular access will be restricted and water or dust suppressants will be applied and maintained at all un-vegetated areas (Complete Section 4-A or 4-B, and 4-C).
- Vegetation will be established on all previously disturbed areas (Complete Section 4-C).
- Gravel will be applied and maintained at all previously disturbed areas (Complete Section 4-C).
- Previously disturbed areas will be paved (Complete Section 4-C).

Unpaved Access and Haul Roads, Traffic and Equipment Storage Areas. (Rule 8021 Sec. 5.2 and 5.3)

- Not applicable for this project (Please explain why in Section 3-F)
- Apply water or dust suppressants to unpaved haul and access roads (Complete Section 4-A or 4-B)
- Post speed limit signs of not more than 15 miles per hour at each entrance, and again every 500 feet. (Complete Section 4-C)
- Water or dust suppressants will be applied to vehicle traffic and equipment storage areas (Complete Section 4-A or 4-B).

Wind Events. (Rule 8021 Sec. 5.4)

- Water application equipment will apply water to control fugitive dust during wind events, unless unsafe to do so.
 - Outdoor construction activities that disturb the soil will cease whenever visible dust emissions cannot be effectively controlled.

Bulk Material Handling



3-E Bulk Materials (Rule 8021 Sec. 6.3.6.6 and Rule 8031)

Outdoor Handling of Bulk Materials. (Rule 8031 Sec. 5.0 A)

- No bulk materials will be handled during this project.
- Water or dust suppressants will be applied when handling bulk materials.
- Wind barriers with less than 50 percent porosity will be installed and maintained, and water or dust suppressants will be applied.

Outdoor Storage of Bulk Materials. (Rule 8031 Sec. 5.0 B)

- No bulk materials will be stored during this project.
- Water or dust suppressants will be applied to storage piles.
- Storage piles will be covered with tarps, plastic, or other suitable material and anchored in such a manner that prevents the cover from being removed by wind action.
- Wind barriers with less than 50 percent porosity will be installed and maintained around the storage piles, and water or dust suppressants will be applied.
- A three-sided structure (< 50% porosity) will be used that is at least as high as the storage piles.

On-Site Transporting of Bulk Materials. (Rule 8031 Sec. 5.0 C)

- No bulk materials will be transported on the project site.
- Vehicle speed will be limited on the work site.
- All haul trucks will be loaded such that the freeboard is not less than six inches when transported across any paved public access road.
- A sufficient amount of water will be applied to the top of the load to limit visible dust emissions.
- Haul trucks will be covered with a tarp or other suitable cover.

Off-Site Transporting of Bulk Materials. (Rule 8031 Sec. 5.0 D)

- No bulk materials will be transported to or from the project site.
- The following practices will be performed: (complete Section 5-B)
 - The interior of emptied truck cargo compartments will be cleaned or covered before leaving the site.
 - Spillage or loss of bulk materials from holes or other openings in the cargo compartment's floor, sides, and tailgates will be prevented.
 - Haul trucks will be covered with a tarp or other suitable cover or will be loaded such that the freeboard is not less than six inches when transported on any paved public access road to or from the project site and a sufficient amount of water will be applied to the top of the load to limit visible dust emissions.

Outdoor Transport using a Chute or Conveyor. (Rule 8031 Sec. 5.0 E)

- No chutes or conveyors will be used.
- Chute or conveyor will be fully enclosed.
- Water spray equipment will be used to sufficiently wet the materials.
- Transported materials will be washed or screened to remove fines (PM10 or smaller).

3-F Comments

Bulk Material Handling



Chutes & Conveyors



Wind Driven Fugitive Dust



07/13/2004

Site Grading





Dust Control Plan
Section 4 – Dust Control Methods – Page 1

Project Name: _____

4-A Water Application

Complete this section if water application will be used as a control method for limiting visible dust emissions and stabilizing surface areas. Check and answer everything that applies to this project.
(Rule 8021 Sec. 6.3.6.6)

Water Application Equipment:

Sprinklers: Describe the activities that will utilize sprinklers:

Minimum treated area: _____ Square Feet Acres

Maximum treated area: _____ Square Feet Acres

Minimum water flow rate: _____ Duration: _____

Water Truck, Water Trailer, Water Wagon, Other: _____

Describe the activities that will utilize this equipment:

Number of application equipment available: _____

Application equipment capacity: _____

Application frequency: _____

Application rate: _____ Gallons per acre per application

Hours of operation: _____

Water application equipment is available to operate after normal working hours, on weekends, and holidays.

After-hours contact: _____ Phone No.: _____

After-hours contact: _____ Phone No.: _____

Water Supply: Include the relative locations of these sources on the plot plan in Section 2.

Fire hydrants

Number of hydrants available On-Site: _____ Off-Site: _____

Approval granted by the owner or public agency to use their fire hydrants for this project.

Owner or Agency: _____

Contact: _____ Phone No.: _____

Storage tanks Number and capacity: _____

Wells Number and flow rate: _____

Canal, River, Pond, Lake, etc. Describe: _____

Approval granted by the owner or public agency to use their water source for this project.

Owner or Agency: _____

Contact: _____ Phone No.: _____

Other: _____

Water Trailer Tank











Sprinklers



Spray Nozzles

Section 4 – Dust Control Methods – Page 2

Project Name: _____

4-B Dust Suppressant Products

Complete this section if a dust suppressant product will be used. These materials include, but are not limited to: hygroscopic suppressants (road salts), adhesives, petroleum emulsions, polymer emulsions, and bituminous materials (road oils). (Rule 8021 Sec. 6.3.6.6)

Copy this page if more than one dust suppressant product will be used.

Not Applicable. Only water application will be the control method used. **Skip to 4-C.**

Application Area: _____

Product Name: _____

Contractor's Name: _____ Phone No: _____

Application Rate: _____ Gallons of undiluted material per mile or acre treated.

Application Frequency: _____ Applications per week, month, year

Application Equipment: _____

Number of Application Equipment Available: _____

Application Equipment Capacity: _____

Attach each of the following information that fully describes this product. Use the checklist below to make sure all information is submitted with this plan.

- Product Specifications (MSDS, Product Safety Data Sheet, etc.)
- Manufacturer's Usage Instructions (method, frequency, and intensity of application)
- Environmental impacts and approvals or certifications related to the appropriate and safe use for ground application.



Chemical Suppressants

Project Name: _____

4-C Other Dust Control Methods

Check below the other types of dust control methods that will be employed at the construction site.
(Rule 8021 Sec. 5.2)

- Physical barriers for restricting unauthorized vehicle access:
 - Fences Gates Posts Berms Concrete Barriers
 - Other: _____
- Wind barriers Describe: _____
- Posted speed limit signs meet State and Federal Department of Transportation standards. (Rule 8021 Sec. 5.3)
 - Posted at 15 miles per hour, Posted at _____ miles per hour (less than 15 MPH)
- Re-establish vegetation for temporarily stabilizing previously disturbed surfaces.
 - Explain: _____
- Apply and maintain gravel:
 - On haul roads On access roads At equipment storage yards
 - At vehicle traffic areas For temporarily stabilizing previously disturbed areas.
 - Explain: _____
- Apply pavement:
 - Explain: _____
- Other: _____

4-D Contingencies

Contingencies to be implemented if application equipment becomes inoperable, more equipment is needed to effectively control fugitive dust emissions during active and inactive periods, accessibility limitations occur at the water sources, or staff is not available to operate the application equipment. Describe the contingencies that will be in place and when they will be implemented. Attach any additional information if needed. (Rule 4102 and Rule 8021 Sec. 6.3.6.6)

4-E Record keeping (Rule 8011 Sec. 6.2)

Records and any other supporting documents for demonstrating compliance must be maintained, but only for those days when a control measure is implemented. The District has developed record keeping forms that may be used for complying with this requirement. Check one or both below:

- Records will be maintained using the forms developed by the District.
 - Records will be maintained using documents or forms developed by the owner or operator.
- Explain and include copies: _____

Example of Wind Fence & Dry Fog



Before



After



Wind Fence

Fog

Restricted Access



Posted Signs

CAUTION
DUST
AHEAD

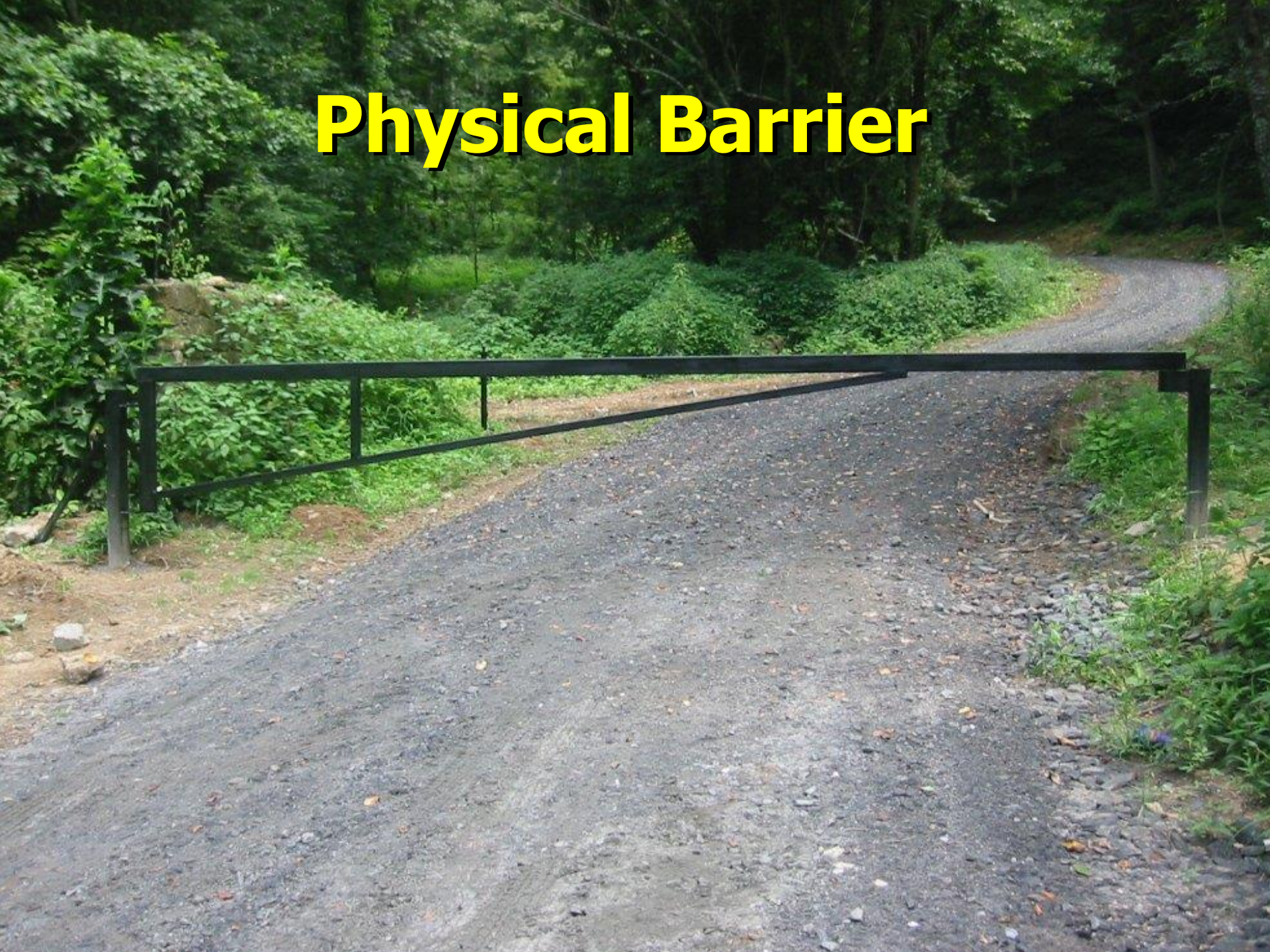
ROAD
ENDS
AHEAD





Speed Limits

Physical Barrier



A photograph showing a wide, paved road leading towards an industrial facility. In the middle ground, a white truck is driving away from the camera. To the left, there is a sign on a post. The sky is overcast. The text 'Application of Gravel to Mitigate Dust' is overlaid in large, bold, yellow letters with a black outline at the bottom of the image.

**Application of Gravel
to Mitigate Dust**

Dust Control Plan
Section 5 – Carryout and Trackout – Page 1

Project Name: _____

5-A Treatments for Preventing Trackout

Select the control devices that will be used for preventing trackout from occurring onto paved public roads. Trackout is any material that adheres to vehicle tires and is deposited onto a paved public road or the paved shoulder of a paved public road. Check one or a combination that will apply to this project.

- Grizzly:** Rails, pipes, or grates used to dislodge debris off of vehicles before exiting the site. Extends from the intersection with the paved public road surface for the full width of the unpaved exit surface for a distance of at least 25 feet. (Rule 8041 Sec. 5.9.1)

Describe: _____

- Gravel Pad:** A layer of washed gravel at least one (1) inch or larger in diameter, three (3) inches deep, and extends from the intersection with the public paved road surface for the full width of the unpaved exit surface for a distance of at least 50 feet. (Rule 8041 Sec. 5.9.2)

Gravel Size: _____ Inches

Pad Width: _____ Feet Length: _____ Feet Depth: _____ Inches

- Paved Surface:** Extends from the intersection with the paved public road surface for the full width of the unpaved access road for at least 100 feet to allow mud and dirt to drop off of vehicles before exiting the site. (Rule 8041 Sec. 5.9.3)

Width: _____ Feet Length: _____ Feet

Mud and dirt deposits accumulating on paved interior roads will be removed with sufficient frequency, but not less frequently than once per workday. Cleanup will commence within ½ hour of generating any carryout and trackout. (Rule 8041 Sec. 5.8.2 and 5.9.3)

Clean-up Frequency: _____

- Wheel Washer:** Uses water to dislodge debris from tires and vehicle undercarriage. (Rule 8011 Sec. 3.73)

Describe: _____

- Other:** (Rule 8041 Sec. 5.8.1.2) _____

5-B Treatments for Preventing Carryout

Report the required treatments that will be used for preventing carryout from occurring on paved public roads. Carryout occurs when materials from emptied or loaded haul trucks, vehicles, or trailers falls onto a paved public road or paved shoulder of a paved public road.

- No haul trucks will be routinely entering or leaving the project site.

Emptied Haul Trucks: (Rule 8031 Sec 5.0)

Interior cargo compartments will be cleaned before leaving the project site.

Cargo compartment will be covered with a tarp or suitable cover before leaving the project site.

Loaded Haul Trucks: Spillage or loss of materials from holes or other opening in the cargo compartment will be prevented when material is transported onto any paved public access road. (Rule 8031 Sec 5.0)

Select one or both of the required applications:

Haul trucks will be loaded such that the freeboard is not less than six inches with water applied to the top of the load before leaving the project site.

Cargo compartment and load will be covered with a tarp or suitable cover before leaving the project site.

- Other:** _____



**Track-out caught in
truck treads**

Preventative Measures

- ❖ Grizzly
- ❖ Gravel pad
- ❖ Paved surfaces
- ❖ Wheel washers



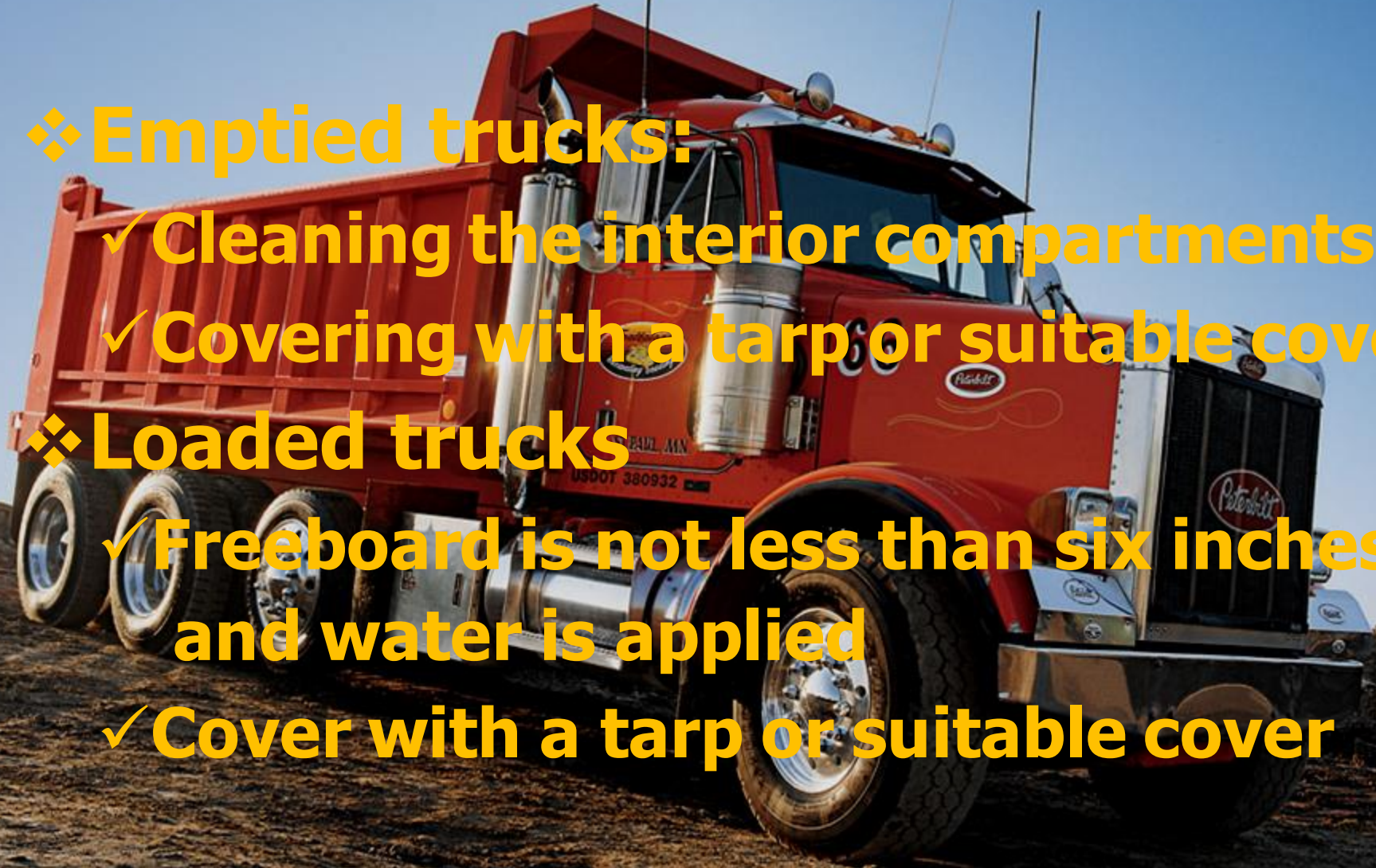
Preventing Carryout

❖ Emptied trucks:

- ✓ Cleaning the interior compartments
- ✓ Covering with a tarp or suitable cover

❖ Loaded trucks

- ✓ Freeboard is not less than six inches and water is applied
- ✓ Cover with a tarp or suitable cover



Load Cover on Trucks



Section 5 – Carryout and Trackout – Page 2

Project Name: _____

5-C Cleaning up Carryout and Trackout

Check and report below the methods and frequency for cleaning up carryout and trackout from the surface and paved shoulders of paved public roads.

The use of blower devices, or dry rotary brushers or brooms, for removal of carryout and trackout from paved public roads is prohibited. (Rule 8041 Sec. 5.0).

In the event the control device becomes ineffective due to an accumulation of mud and dirt, material must be removed within ½ hour of the generation of carryout and trackout. (Rule 8041 Sec. 5.8.2.)

The project is located in:

- An **Urban Area**, within an incorporated city boundary or an unincorporated area surrounded by a city.
Minimum cleanup frequency will be at the end of the workday and removed immediately if carryout and trackout extends beyond 50 feet. (Rule 8041 Sec. 5.4)
- A **Rural Area**, located within an unincorporated area and not surrounded by an incorporated city.
- The construction project is less than 10 acres in size: minimum cleanup frequency is at the end of the workday. (Rule 8041 Sec. 5.1)
 - Construction projects 10 or more acres in size: minimum cleanup frequency is end of the workday and immediately if carryout and trackout extends beyond 50 feet. (Rule 8041 Sec. 5.5)

Clean up Method: Check the method below that will be used for cleaning carryout and trackout.

- Manually sweeping and picking up. (Rule 8041 Sec. 5.7.1)
- Mechanical sweeping with a rotary brush or broom accompanied or preceded by water. (Rule 8041 Sec. 5.7.2)
- Describe the types of equipment that will used:

- Operating a PM10-efficient street sweeper. (Rule 8041 Sec. 5.7.3)

Make and Model: _____

- Flushing with water: allowed if: (Rule 8041 Sec. 5.7.4)
- No curbs or gutters are present.
 - Using water will not result as a source of trackout and carryout.
 - Using water will not result in adverse impacts on storm water drainage systems.
 - Using water will not violate any National Pollutant Discharge Elimination System permit program.

5-D Record keeping for Cleanup of Carryout and Trackout (Rule 8011 Sec. 6.2)

Records and any other supporting documents for demonstrating compliance must be maintained. The District has developed a record keeping form specific for cleaning carryout and trackout from paved public roads and may be used for complying with this requirement. Check one or both below:

- Records will be maintained using the form developed by the District.
- Records will be maintained using documents or forms developed by the owner or operator.

Explain and include copies: _____

Dust Control Plan
Section 6 – Certification

Project Name: Tom's Apt Complex

6-A Certification

I certify that all information contained herein and information submitted in the attachments to this documents are true and correct.

Dusty Fields
Print Name

Project Foreman
Title

Dusty Fields
Signature

Date

555-1212
Phone Number

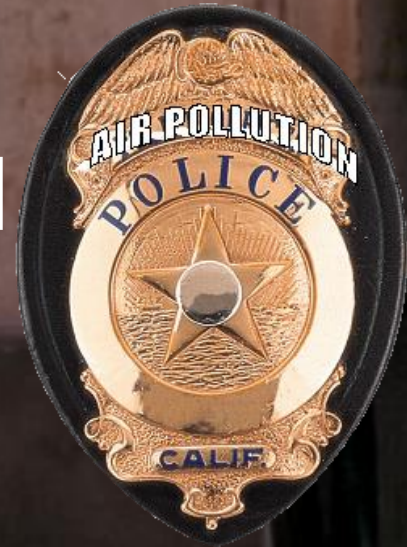
555-1234
Cell Number


Fax Number

Cell Number

What about Violations?

- ❖ Notice Of Violation (NOV):
 - ❖ Failed Visible Dust Emission Evaluation (VDE > 20%)
 - ❖ Failed to Meet a “Stabilized Surface”
 - ✓ Silt Content > 6% or 8%
 - ✓ Silt Loading > 0.33 oz/ft²





Four Options After Being Issued An NOV

- ✓ **Continue to Operate in Violation**
- ❖ **Cease the Non-compliant Activity**
- ❖ **Correct the Problem**
- ❖ **Apply for a Variance**

Summary of “non-VEE” Test Methods To Determine a Stabilized Surface

- 1. Visible Crust Determination**
- 2. Determination of Silt Content for Unpaved Roads and Unpaved Vehicle/Equipment Traffic Areas**
- 3. Determination of Threshold Friction Velocity (TFV)**
- 4. Determination of Flat Vegetative Cover**
- 5. Determination of Standing Vegetative Cover**
- 6. Rock Test Method**

“Stabilized Surface”

- **Surface is “Stable” if...**
 - **Visible Crust is in compliance**
 - **Threshold Friction Velocity ≥ 100 cm/sec**
 - **Flat vegetation cover $\geq 50\%$**
 - **Standing vegetation cover $\geq 30\%$**
 - **Combination of standing veg. & TFV**
 - **Non-erodible elements $\geq 10\%$**
- **Unpaved Roads-silt content $\leq 6\%$**
- **Unpaved Traffic Areas-silt content $\leq 8\%$**



“Stabilized Surface”

“Any disturbed surface area or open bulk storage pile resistant to wind blown fugitive dust emissions.”

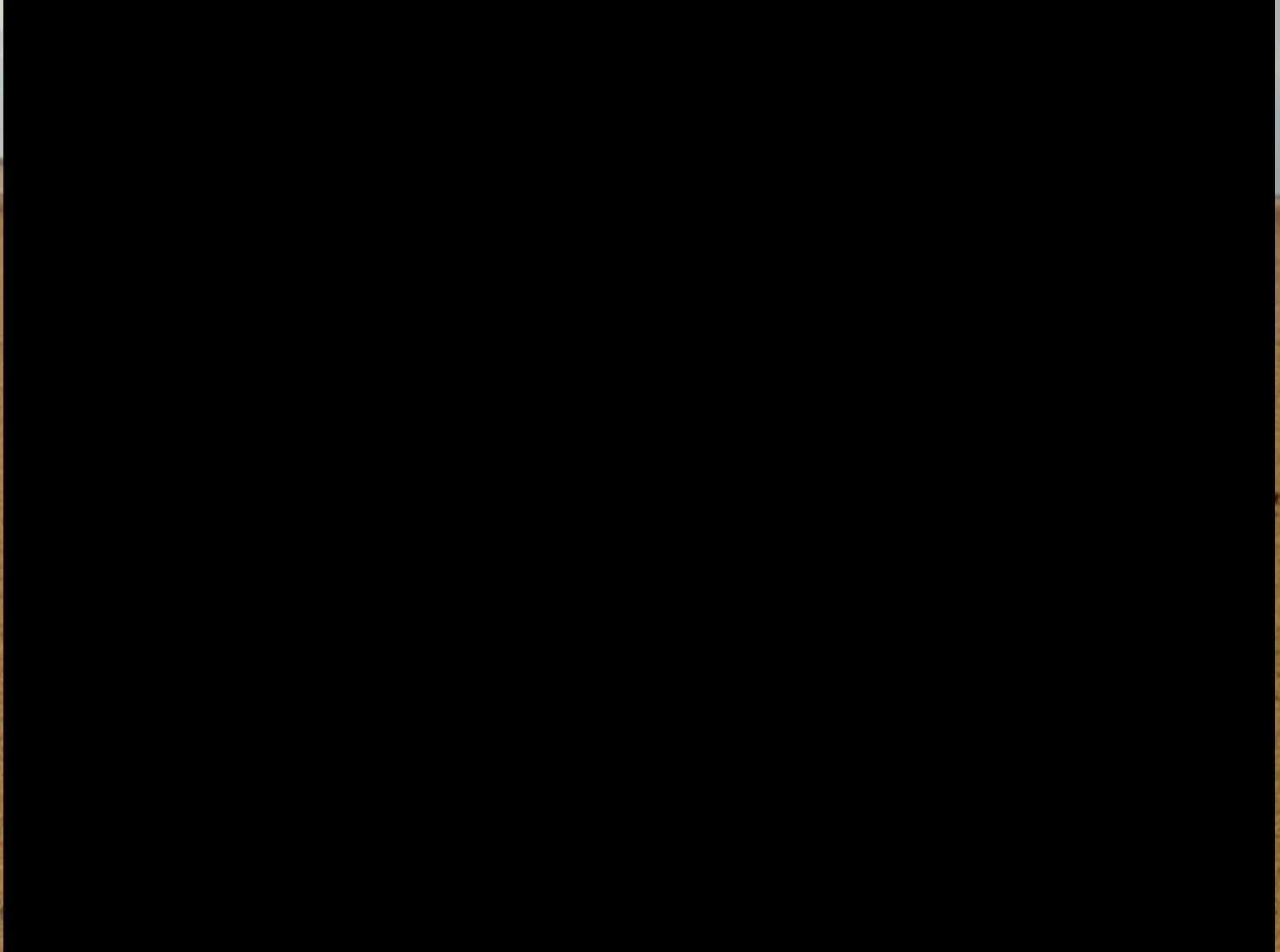
Disturbed Surface Area

❖ An area in which naturally occurring materials have been physically moved, uncovered, destabilized, or otherwise modified by grading, excavating or similar activities and vehicle traffic and/or equipment operation has occurred

Visible Crust Determination

- ❖ First, determine if there is a visible crust
- ❖ Then, proceed with the “Ball Drop” test method to determine if there is a sufficient crust to establish compliance
 - ❖ *The higher the silt content, the more fine particles can be released during vehicle traffic*

Visible Crust Determination



Visible Crust Determination



❖ Step 1:

❖ Use a steel ball with a diameter of 15.9 mm (0.625) and a mass ranging from 16-17 grams

Visible Crust Determination



❖ Step 2:

❖ Drop the Ball from a Distance of 30 cm (1 foot) Directly Above (at a 90° Angle Perpendicular to) the Soil Surface

Visible Crust Determination

❖ Step 3:

❖ The Surface is **STABLE** if the Ball Does Not Sink so that it is Partially or Fully Surrounded by Loose Grains and, Upon Removing the Ball, the Surface Has Not Been Pulverized (Loose Grains Are Visible)



Visible Crust Determination

❖ Step 4:

❖ Drop the Ball Three Times Within a Random Survey Area of 1 Square Foot of the Overall Disturbed Site. A "Visible Crust" is Present if the "Drops" Pass Two Out of Three Times

Visible Crust Determination

A person wearing khaki pants and a dark shirt is kneeling on a sandy, light-brown ground. They are leaning forward, with their hands near the surface of the soil, appearing to be conducting a field test. The background shows more of the same sandy terrain with some sparse green grass.

- ❖ **If the Surveyed Portion Does Not Appear to Represent the Crust Condition of the Overall Site, Repeat the Test as Often as Necessary in Order to Determine Compliance**

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests



Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

❖ Step 1:

- ❖ Mark out Dirt Within a Well Traveled Area to an Approx. Depth of $3/8''$ in a 1 ft^2 Area. Collect a Sample of Loose Surface Material into a Dustpan.



Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

A white plastic container is placed on a digital scale, which is resting on a light-colored, flat surface. The scale's display is visible, showing a reading. The background is a textured, brownish surface, likely soil or sand.

❖ Step 2:

- ❖ Place an Empty Container on a Scale on a Level Surface. Zero the Scale with the Weight of the Empty Container (tare weight)

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

❖ Step 3:

❖ Transfer the Entire Sample Collected in the Dustpan to the Container.

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

❖ Step 4:

- ❖ Weigh the Total Weight of the Sample and the Container. Subtract the Weight of the Empty Container (tare weight) from the Total Weight to Find the Weight of the Sample.

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

A stack of five yellow sieved collectors, used for soil testing, is shown on a sandy surface. The top collector has a mesh screen. A black collection pan is visible at the bottom of the frame.

❖ Step 5:

- ❖ **Stack a Set of 5 Sieved Collectors in Order According to Size Openings, With the Largest Size Opening on Top. Place a Collection Pan Underneath**

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

❖ Step 6:

❖ Carefully Pour the Sample into the Sieve Stack. Hold the Stack and Vigorously Shake it Up and Down and Sideways.



Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

❖ Step 7:

- ❖ Make Sure All the Finer Material Has Passed Through the Sieves and into the Collection Pan**

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

❖ Step 8:

❖ Weigh the Collection Pan with the Fine Material and then Again Empty. Calculate the Weight of the “Fine Material” that Has Passed Through All the Sieves

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests



❖ Step 9:

❖ Perform the Test Two More Times. Calculate the Percent Silt Content and Average Silt Loading Using the Formulas in the Test Method

Determination of Silt Content for Unpaved Roads and Vehicle/Equipment Traffic Areas and TFV Tests

- ❖ **If Source is an Unpaved Road and the Avg. "PSC" is 6% or Less, the Surface is **STABLE****
- ❖ **If Unpaved Parking Lot and the Avg. "PSC" is 8% or Less, the Surface is **STABLE****

Determination of Threshold Friction Velocity (TFV)

- ❖ For Disturbed Surface Areas That are not Crusted or Vegetated, This Test Measures the Characterization of Site Erodibility and it's Susceptibility to Wind Erosion**
- ❖ TFV Must be 100 cm/sec or greater, Corrected for Non-Erodible Elements, to be Considered Stable**

Determination of Threshold Friction Velocity (TFV)

A stack of five brass sieves is shown, with the top sieve having the largest openings and the bottom sieve having the smallest. The sieves are stacked on a light-colored, textured surface. The text is overlaid on the image.

❖ **Step 1:**

❖ **Obtain and Stack a Set of 5 Sieves in Order According to Size Openings, With Largest Size Opening on Top**

❖ **Place a Collector Pan Underneath**

A black collector pan is shown at the bottom of the image, partially obscured by the text. It has a handle and a flat base.



Determination of Threshold Friction Velocity (TFV)

❖ Step 2:

❖ Collect a Sample of Loose Surface Material From a 1 ft Square Area, and a Depth of 1 cm, into a Dustpan

❖ Remove any Rocks Larger Than 1 cm in Diameter

Determination of Threshold Friction Velocity (TFV)

A person wearing a plaid shirt and light-colored pants is standing on a sandy surface. They are holding a black, corrugated metal sieve stack over a yellow bucket. The sieve stack is tilted, and a dark, granular sample is being poured into it. The bucket is partially filled with the same material. The background is a vast, flat, sandy area.

❖ **Step 3:**

❖ **Pour Sample into the Top Sieve**

❖ **Cover Stack with a Lid**

Determination of Threshold Friction Velocity (TFV)

A man wearing a blue and red plaid shirt and light-colored pants is standing in a sandy field. He is holding a stack of four brass cylinders with both hands. The background shows a sandy area with some sparse vegetation and a concrete curb.

❖ **Step 4:**

❖ **Move the Stack in a Broad Circular Motion, 10 Times Clockwise and Counterclockwise**

Determination of Threshold Friction Velocity (TFV)

- ❖ **Step 5:**
- ❖ **Remove the Lid and Disassemble Each Sieve, Beginning With the Largest Sieve**
- ❖ **Tilt and Tap the Sieves so That the Material Aligns to One Side of Each Sieve**
- ❖ **Visually Determine Which Sieve Contains the Largest Volume of Material**

Determination of Threshold Friction Velocity (TFV)



- ❖ **Step 6:**
- ❖ **If unable to Visually Determine the Results, Use a Graduated Cylinder to Measure the Volume of Each Sieve**
- ❖ **Estimate the TFV for the Sieve Catch With the Greatest Volume Using the Table in the Test Method**
- ❖ **Repeat Test Two More Times**

Determination of Flat Vegetative Cover

- ❖ **Flat Vegetation Includes Attached (rooted or dead) Vegetation or Unattached Vegetation Debris Lying on the Surface With a Predominant Horizontal Orientation That is Not Subject to Wind**

Determination of Flat Vegetative Cover

❖ Step 1:

- ❖ Choose a Survey Area That Represents a Random Portion of the Overall Conditions of the Site

Determination of Flat Vegetative Cover

A person wearing a blue shirt, blue pants, and a high-visibility safety vest is standing in a field of low-lying green vegetation. They are holding a long, thin measuring tape that stretches across the ground. In the background, there are several white vehicles parked, and a blue car is visible on the left. The ground is a mix of dirt and sparse grass.

❖ Step 2:

❖ **Stretch a 100 Foot Measuring Tape Across the Area**

Determination of Flat Vegetative Cover

❖ Step 3:

- ❖ **Firmly Anchor Both Ends of the Tape into the Surface Using a Tool Such as a Screwdriver, With the Tape Stretched Taut and Close to the Soil Surface**

Determination of Flat Vegetative Cover

❖ Step 4:

- ❖ Pinpoint an Area the Size of a $3/32$ " dowel Centered Above Each 1 Foot Interval Marks Along the Tape
- ❖ Count the Number of Times That Flat Vegetation Lies Directly Underneath the Pinpointed Areas Along the Tape
- ❖ The Number Counted Represents the Percentage of Vegetation Cover
- ❖ Repeat Test Two More Times and Average the Three Results

Determination of Flat Vegetative Cover

❖ **The “Flat Vegetation Cover” Must Cover at Least 50% of the Site to Qualify as a “Stabilized Surface”**

Determination of Standing Vegetative Cover

❖ **Standing Vegetation Includes Vegetation That is Attached (rooted, dead or alive) With a Predominant Vertical Orientation**

Determination of Standing Vegetative Cover

- ❖ **Percent Cover Standing;
Vegetative Density Factor**
- ❖ **Use Equations 10 & 11**
- ❖ **If Percent Vegetative Density is
= or $>$ 30, Use Eqs. 16, 17 or 18**
- ❖ **If $<$ 30, Use Equations 12 & 13 to
Calc. the Frontal Silhouette Area**

Determination of Standing Vegetative Cover

- ❖ **Standing Vegetation Must Cover at Least 30% That is Attached With a Predominant Vertical Orientation or 10% Where the TFV is at Least 43 cm/sec When Corrected for Non-Erodible Elements**

Rock Test Method (Section 7)

- ❖ **Examines the Wind-Resistance Effects of Rocks and Other Non-Erodible Elements on Disturbed Surfaces**
- ❖ **Vegetation Does Not Count as a Non-Erodible Element in this Method (Basically, ONLY Rocks)**

Rock Test Method (Section 7)

- ❖ **If the Average Rock Cover is $>$ or $=$ to 10%, the Surface is “Stable”**
- ❖ **If $<$ 10%, Use Table 2 of the Determination of Threshold Velocity Method (TFV) to Calculate the Correction Factor to the TFV**

Digital Opacity Compliance System

Second Generation

EPA Alternative Method 082, Moving Opacity Technology
Forward the 301 Study for Large Stacks

DOCS II
Digital Opacity Compliance System

Copyright © Virtual Technology 2007,2008,2009,2010

Start a New Observation

Names:

Date: 1/31/2011

Go To New Observation



Import Observation

Open an Existing Observation

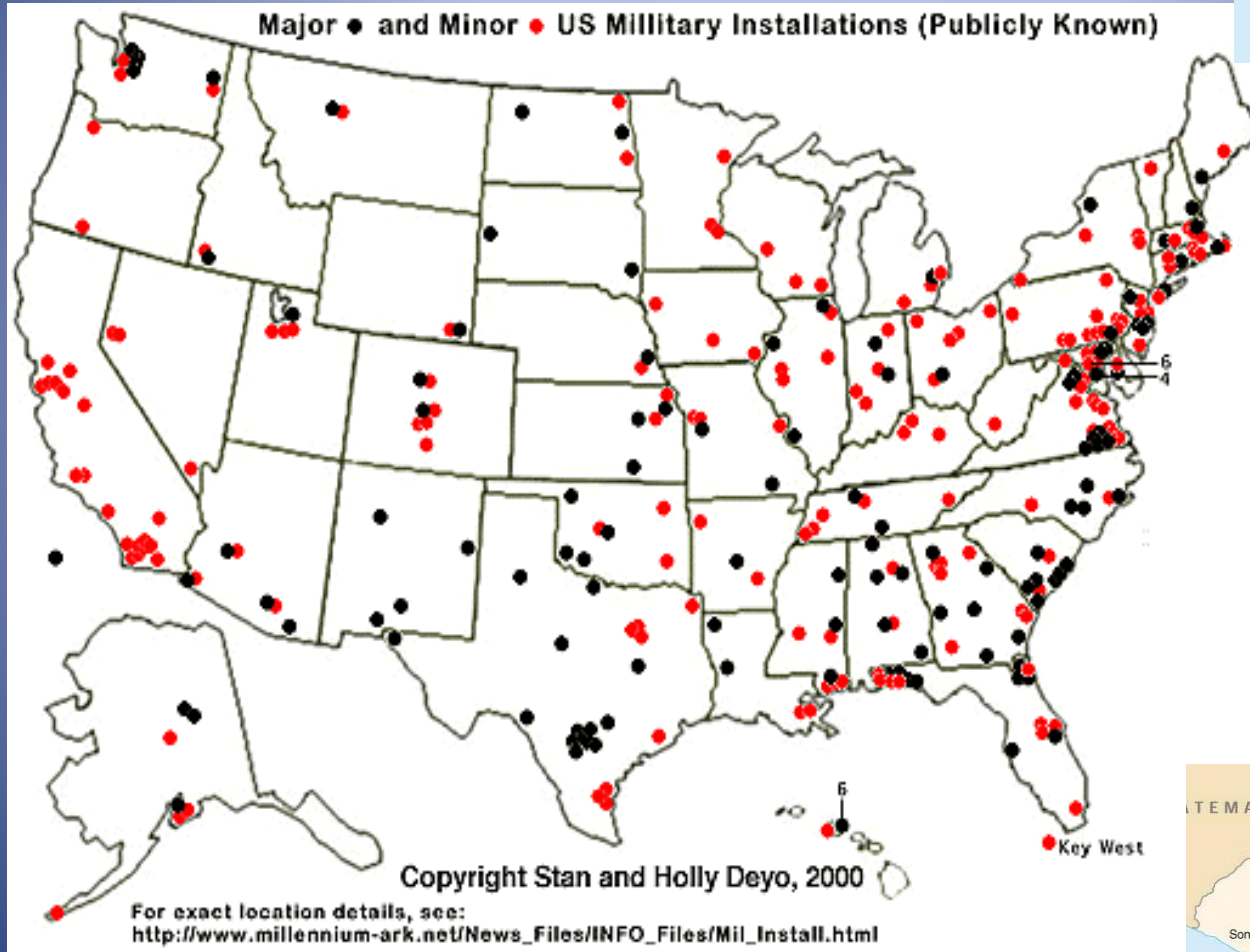
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- green_white
- red_White
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- newcontest
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Save as New

Go To Existing Observation

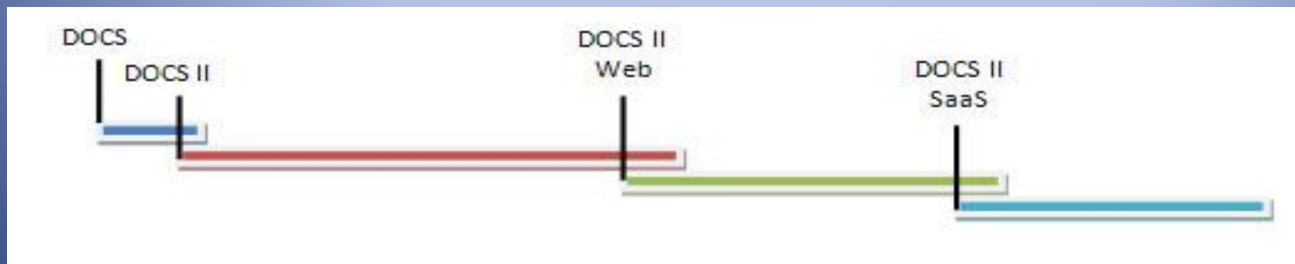
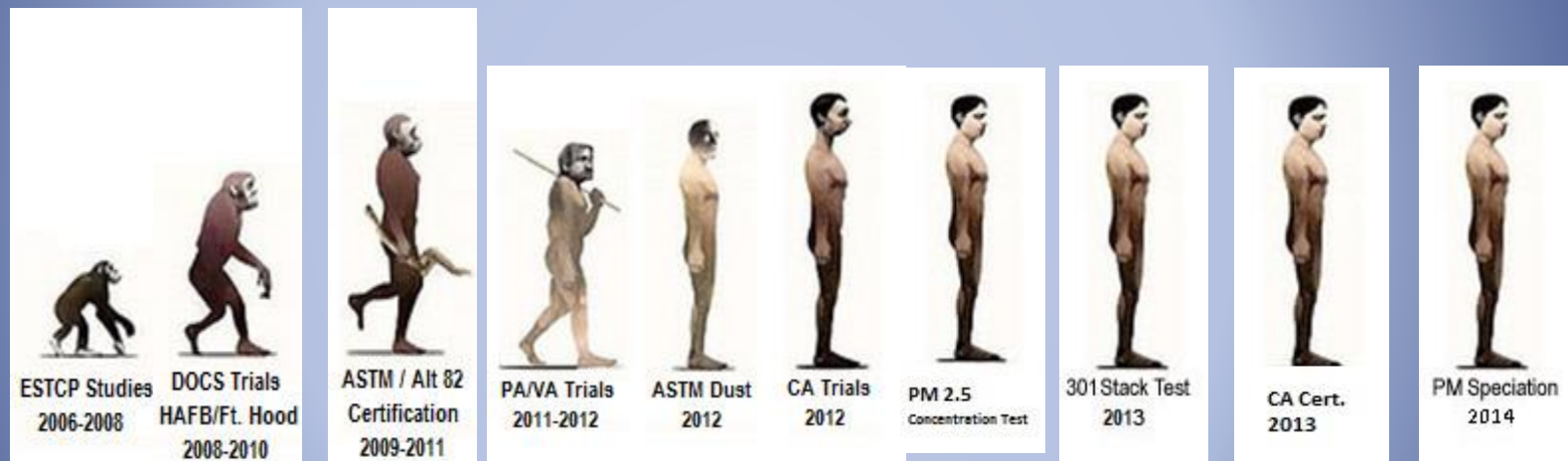


Use of DOCS II



❖ Evolution Of DOCS II (2006-2014)

Evolution of DOCS II ...The Road to DOCS II SaaS



Evolution of DOCS II

- Late 1990's – Initial Digital Camera work by NASA and Utah State
- 2000 to 2005 – Several research projects contracted by DOD & Universities
 - DOD Shared Data with Federal EPA
 - EPA Technology Transfer Network, Emission Technology Center Publishes PRE-008 - Determination of Visible Emissions Opacity from Stationary Sources Using Computer-based Photographic Analysis Systems
- 2005 to 2009 – Research continued by DOD
 - 2007- ASTM Workgroup formed due to EPA's lack of resources
 - 2009 - ASTM 7520-09 approved and published
- Feb 2012 – EPA Office of Air Quality Planning and Standards published EPA Alternate Method 082 (ALT 082), citing ALT 082 certified DCOTS can be used “in-Lieu of” Method 9, for all subparts of 40 CFR 60, 61 and 63
- Jan 2013 – ASTM Fugitive emissions test High Definition Record beta test, within 7% of Transmissometer (300 readings, all opacity levels)
- April 2013 – IFDC PM correlation and High Definition Video production (less than 5% deviation from humans (48,000 readings), 10% from PM concentration <2.5)
- June 2013 – CA Recert, Smoke Schools day and night cert. always below class Deviation Average of 24.
- July 2013- EPA 301 Test stacks greater than 7' (less than 5% deviation, 1.3K readings)
- Feb 2014 – PM Concentration, Laser light second testing scheduled

How DOCS II Works

- An image or images of the emission source are captured by trained/certified camera operator using a certified camera.
- The images are uploaded to “the Cloud” where they are acquired by a certified analyst who identifies the region of interest within the imagery.
- Regions of Interest are marked according to explicit rules.
- DOCS II then applies algorithms to the Regions of Interest and calculates the opacity of each image and the average, based on selected rule, e.g. 6 min. avg., 3 min. avg.
- DOCS II stores an archive of the draft VEE report.
- Source owner accepts/rejects the draft VEE report.
- DOCS II generates final VEE report and archive record.

Simple, Fast, Reliable, Repeatable

Method 9 vs. EPA ALT 082 aka ASTM D7520

EPA Method 9

- Per Person 25 White and 25 Black (50) reading, certification
 - EPA Required Content Training
 - 50 plume certification
 - $\pm 7.5\%$ overall and $\leq 15\%$ within each set of 25.
- Cert. duration 6 months
- Operational conditions
 - Unlimited backgrounds
 - Unlimited weather conditions
- Paper Non-Validated Record

EPA ALT 082

- **System certification**
- (6) sets of (25) White and (25) Black against various backgrounds (300 images)
- 4 independent Analyst use System to derive Opacity of each image (1200 results)
- All (4) Analyst must pass all (6) sets, $\pm 7.5\%$ overall and $\leq 15\%$ within each set of 25
- Cert. duration 3 $\frac{1}{2}$ years
- **Camera Operator training**
 - EPA Required Content Training
 - Camera Operator Training
 - Submit 1 acceptable set of images for analysis every 3 months
- Operational conditions
 - Unlimited backgrounds
 - Unlimited weather conditions
- Digital Validated Record

***Electronic Method 9, allows separation of data
“Capture” from “Analysis”***

EPA ALT 082

Published, Broadly Applicable Standard

- Current Federal Register (CFR) February 2012
 - Can be used in Lieu of Method 9
 - Federal Permit changes not required
 - Recognize limits of ASTM D7520-09 (May 2012)
 - Case by case allowed for stacks >7' exit
- To Eliminate the 7' Limit of ASTM EPA Requested
 - EPA 301 Comparison between (Human Method 9) (Camera ALT 082)
 - What is a 301 Comparison?
 - Compare the Validated Results from each Method
 - EPA Requested a 301 at three different type facilities
 - Cement
 - Coal Fired Power
 - Natural Gas Fired Power

ASTM D7520 Updated

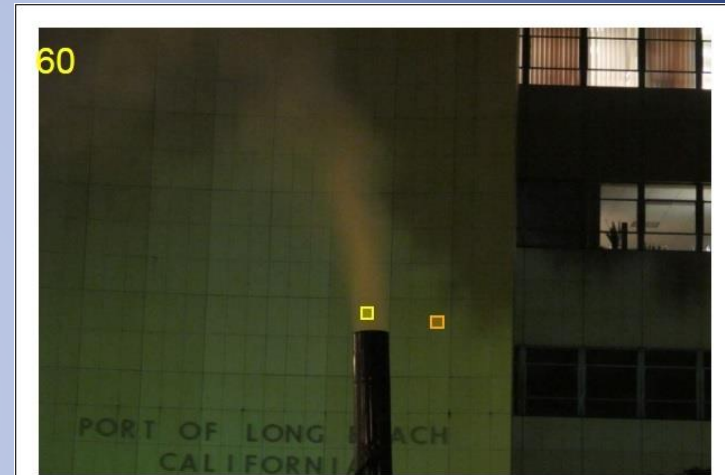
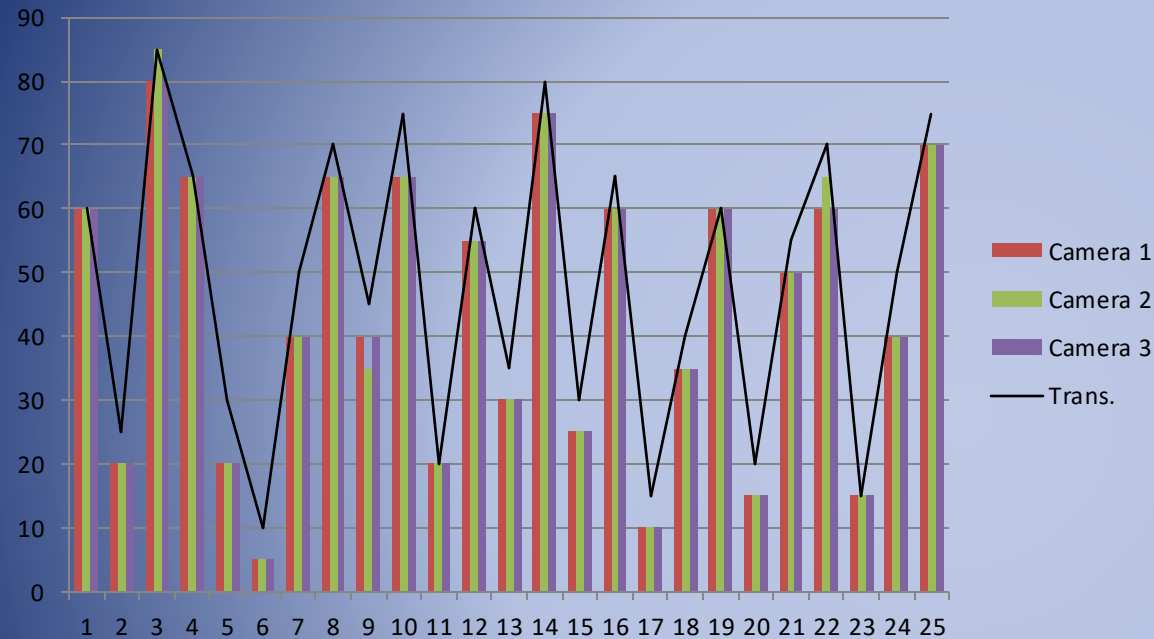
- D7520-12 Updated Approved by D22-03 In October 2012
 - Allows use of any Digital Image Device
 - High Definition Digital Recorders (Digital Video)
 - LTE based Cameras (Cell Phones)
 - CCD based Cameras (98% of Digital Cameras)
 - Matches ASTM Certification requirements to EPA ALT 082
 - Allows certification of optical and digital zoom
 - Enforces Performance of any configuration within Method 9 tolerances and precision and bias of ASTM
- Fugitive Dust Applicability
 - Original research performed using Dust June 05/06/07
 - Full NIST Long Path Trans. certification completed Jan. 12
 - ASTM Research Report submitted to committee July 2012
 - Update to D7520 to include Fugitives per 40CFR 60 sp 000

301 Study Summary

- ALT 082 is the same as Method 9
 - Stacks Greater than 7' at the exit
 - Deviation between Methods is $< 5\%$ overall
 - Deviation individually $< 10\%$
 - Method 9 tolerance is 15%
 - ALT 082 has less variability than Method 9
 - ALT 082 is more repeatable than Method 9

DOCS II CARB Night Smoke School

Long Beach, CA, July 2013



Fugitive Dust Study

Long Path Transmisometer, vs DOCS II and Human

[X] Close Window

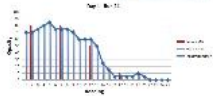


DOCS II Presentations

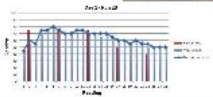
ASTM Dust

Select a Slide:

Dust Study January 2012



Dust Study January 2012



Dust Study January 2012

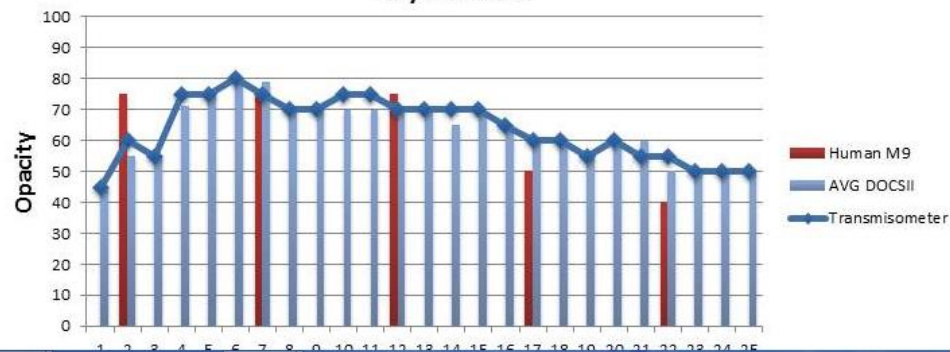


Dust Study January 2012

- Human Readings
 - Less accurate – average deviation of 9%
 - Could not keep up
 - Not enough data for Precision and Bias
- DOCSII
 - More accurate – average deviation of 2%
 - Cameras kept up better
 - Formal Precision and Bias Analysis



Day 1 - Run 23



Slide Related Images



PM Speciation

The Future of DOCS III



DOCS II Presentations

Future

Select a Slide:

Picture Slideshow

- PM
- Handheld Plume Speciation with Laser
- Future



Future Direction

- PM
 - Regulations continue to focus on PM
 - Technology thus far requires luck or “gumption” to capture fugitives
- Handheld Plume speciation with Laser
 - Generally understood as laser “backscatter”
 - Need sub-regulated laser solution
 - We are on our way...



Slide Related Images



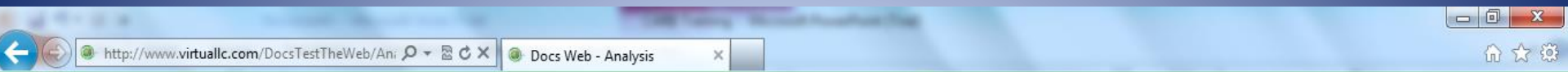
Adding Lasers of multiple wave lengths to the imagery, allows scatter measurements to determine PM size and concentration.

DOCS II Software-as-a-Service (SaaS)

Cloud Computing Servers
Upload observation data from Smart Phone App,
Add facility and source information via web browser
Submit to Lab for Analysis
Approve and Publish Results
Print/Email/Fax Final Report On Demand

TIME	DATE	TIME	DATE	TIME	DATE
10:00	10/24/2012	10:00	10/24/2012	10:00	10/24/2012
10:05	10/24/2012	10:05	10/24/2012	10:05	10/24/2012
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10:45	10/24/2012	10:45	10/24/2012	10:45	10/24/2012
10:50	10/24/2012	10:50	10/24/2012	10:50	10/24/2012
10:55	10/24/2012	10:55	10/24/2012	10:55	10/24/2012
11:00	10/24/2012	11:00	10/24/2012	11:00	10/24/2012
11:05	10/24/2012	11:05	10/24/2012	11:05	10/24/2012
11:10	10/24/2012	11:10	10/24/2012	11:10	10/24/2012
11:15	10/24/2012	11:15	10/24/2012	11:15	10/24/2012
11:20	10/24/2012	11:20	10/24/2012	11:20	10/24/2012
11:25	10/24/2012	11:25	10/24/2012	11:25	10/24/2012
11:30	10/24/2012	11:30	10/24/2012	11:30	10/24/2012
11:35	10/24/2012	11:35	10/24/2012	11:35	10/24/2012
11:40	10/24/2012	11:40	10/24/2012	11:40	10/24/2012
11:45	10/24/2012	11:45	10/24/2012	11:45	10/24/2012
11:50	10/24/2012	11:50	10/24/2012	11:50	10/24/2012
11:55	10/24/2012	11:55	10/24/2012	11:55	10/24/2012
12:00	10/24/2012	12:00	10/24/2012	12:00	10/24/2012

Analysis



Observation Name: mapei i4 2012-06-06



Hello Shawn2 Dolan | Logout | Help

- Home
- Properties
- Source
- Plume
- Location
- Analyze
- Reports

Duration 1:5:0
Image Count 24
Average Opacity 47.71

Method

Minimum Number Of Images N/A Rolling High Count N/A
Seconds Between Images N/A Duration in Minutes N/A

Single Image Background

Manual
 Automatic
 Override

Color Background

Get Images Clear Images



File Name IMG_0628.jpg Camera Mfg/Model Canon Canon PowerShot G11 Date Taken 1/19/2012 9:58:36 AM

Normal Processed Rolling High Background Error



Skip to Content | Legal | Privacy | Security | Terms of Service



12:31 AM
6/13/2012

Enhanced Visibility with Filters

Duration 0:29:45
Image Count 119
Average Opacity 24.62

Method Total Average
Minimum Number Of Images 1 Rolling High Count N/A
Seconds Between Images N/A Duration in Minutes N/A

Single Image Background

Manual Next Image
 Automatic Start Analysis
 Override Submit

Color White Background Blue

Get Images Clear Images

Duration 0:29:45
Image Count 119
Average Opacity 24.62

Method Total Average
Minimum Number Of Images 1 Rolling High Count N/A
Seconds Between Images N/A Duration in Minutes N/A

Single Image Background

Manual Next Image
 Automatic Start Analysis
 Override Submit

Color White Background Blue

Get Images Clear Images

Duration 0:29:45
Image Count 119
Average Opacity 24.62

Method Total Average
Minimum Number Of Images 1 Rolling High Count N/A
Seconds Between Images N/A Duration in Minutes N/A

Single Image Background

Manual Next Image
 Automatic Start Analysis
 Override Submit

Color White Background Blue

Get Images Clear Images

Filter 1 B&W

Filter 2 Negative

Filter 3 Sepia

File Name IMG_3695.JPG Camera Mfg/Model Canon Canon PowerShot G11 Date Taken 6/2/2013 12:41:37 PM

Normal Processed Rolling High Background Error Scale

Duration 0:29:45
Image Count 119
Average Opacity 24.62

Method Total Average
Minimum Number Of Images 1 Rolling High Count N/A
Seconds Between Images N/A Duration in Minutes N/A

Single Image Background

Manual Next Image
 Automatic Start Analysis
 Override Submit

Color White Background Blue

Get Images Clear Images

Duration 0:29:45
Image Count 119
Average Opacity 24.62

Method Total Average
Minimum Number Of Images 1 Rolling High Count N/A
Seconds Between Images N/A Duration in Minutes N/A

Single Image Background

Manual Next Image
 Automatic Start Analysis
 Override Submit

Color White Background Blue

Get Images Clear Images

Filter 4 Red

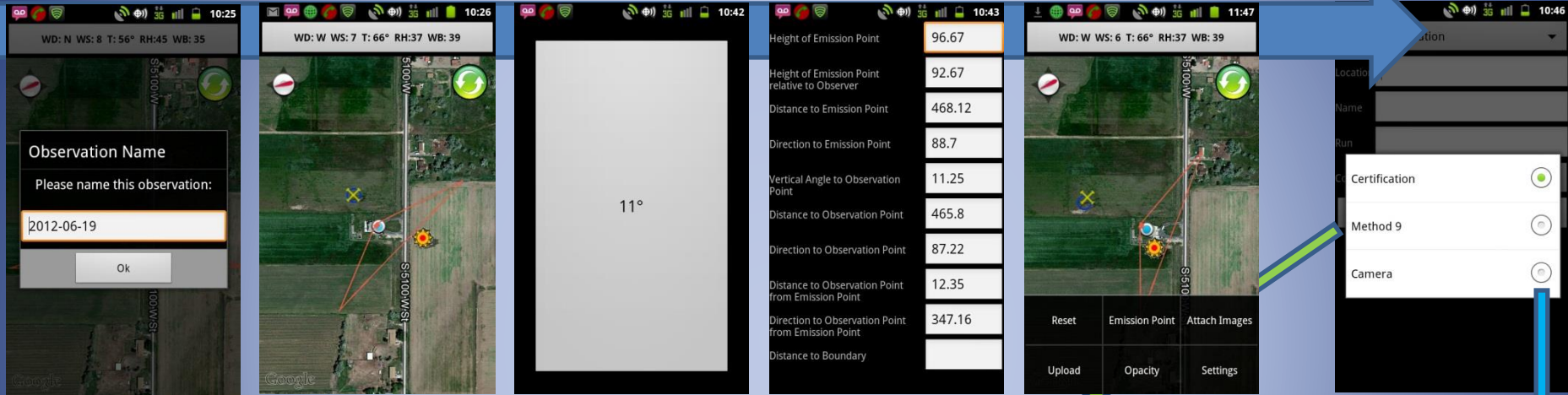
File Name IMG_3695.JPG Camera Mfg/Model Canon Canon PowerShot G11 Date Taken 6/2/2013 12:41:37 PM

Normal Processed Rolling High Background Error Scale

DOCS II SaaS Data Collection

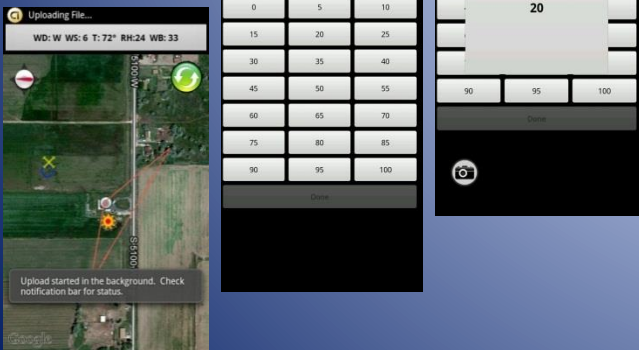
“Method 9” in the Google Play Store

Document a Method 9 VEE on your Handheld



Method 9

Display Timer & Count



Alt. Method 082

Auto Timer & Count



Report

VISIBLE EMISSION OBSERVATION FORM

Method Used
Method 9

Company Name
Consolidated Cabinetry

Facility Name
Layton Site

Street Address
125 Main Street

City
Falls Church

State
VA

Zip
22040

Process Unit Operating Mode
Sidewall Preparation 67 80%

Control Equipment Operating Mode
Specialized Catalytic Converter 100%

Describe Emission Point
Single Stack on Generator

Height of Emiss. Pt. End Same Start 0 End Same
Distance to Emiss. Pt. End Same Start 405.34 End Same
Direction to Emiss. Pt. (Degrees) End Same Start 0 End Same

Vertical Angle to Obs. Pt. End Same Start 0 End Same
Direction to Obs. Pt. End Same Start 339 End Same
Distance and Direction to Observation Point from Emission Point End Same Start 184.8 / 23.79 End Same

Describe Emissions
Start Uniform Columnar Plume End Same
Emission Color Start Black End Same
Water Droplet Plume Attached: () Detached: () N/A: (X)

Describe Plume Background
Start Sky End Same
Background Color Start Blue End Same
Sky Conditions Start Clear End Same
Wind Speed Start 9 End Same
Wind Direction Start 180 End Same
Ambient Temp. Start 57 End Same
Wet Bulb Temp. Start 48 End Same
RH Percent Start 72 End Same



Longitude 111.55.25.000 W Latitude 40.46.21.000 N

Additional Information
This is only a test

Form Number _____ Page _____ of _____
Continued on VEO Form Number _____

Observation Date 3/24/2010 Time Zone MST Start Time 10:02 End Time 10:09

	0	15	30	45	Comments
1	10	5	0	10	
2	10	5	10	5	
3	10	5	10	10	Avg. Opacity = 6.667
4	0	5	10	5	
5	5	10	5	5	
6	5	0	5	10	
7	0	10	10	5	
8					
9					
10					
11					
12					
13					
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15					
16					
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30					
31					
32					



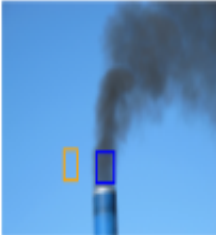
Observers Name (Print)
Pat Griecox
Observers Signature _____ Date _____

Organization _____

Certified By _____ Date _____

Image	Opacity	Coordinates	Camera and Weather Information
	10	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:03:45 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	10	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:04:00 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	5	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:04:15 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	10	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:04:30 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	5	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:04:45 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	10	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:05:00 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	5	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:05:15 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48
	10	Foreground Coordinates T L B R 1900 1800 2122 1688 Background Coordinates T L B R 1945 1373 2110 1299	Date Taken 3/24/2010 10:05:30 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction S Wind Speed 9 Temperature 57 Rel Humidity 72 Wet Bulb Temp 48

Forensic Data

Image	Opacity	Coordinates	Camera and Weather Information																
 <p>IMG_0222.JPG</p>	55	Foreground Coordinates <table border="1"> <tr> <td>T</td> <td>L</td> <td>B</td> <td>R</td> </tr> <tr> <td>1761</td> <td>1862</td> <td>2128</td> <td>1808</td> </tr> </table> Background Coordinates <table border="1"> <tr> <td>T</td> <td>L</td> <td>B</td> <td>R</td> </tr> <tr> <td>1788</td> <td>1280</td> <td>2183</td> <td>996</td> </tr> </table>	T	L	B	R	1761	1862	2128	1808	T	L	B	R	1788	1280	2183	996	<p>Date Taken 3/24/2010 10:00:40 AM</p> <p>Camera Mfg/Model Canon/Canon PowerShot G11</p> <p>Wind Direction SW Wind Speed 10</p> <p>Temperature 60 Rel Humidity 38</p> <p>Wet Bulb Temp 34</p>
T	L	B	R																
1761	1862	2128	1808																
T	L	B	R																
1788	1280	2183	996																
 <p>IMG_0223.JPG</p>	75	Foreground Coordinates <table border="1"> <tr> <td>T</td> <td>L</td> <td>B</td> <td>R</td> </tr> <tr> <td>1783</td> <td>1911</td> <td>2139</td> <td>1595</td> </tr> </table> Background Coordinates <table border="1"> <tr> <td>T</td> <td>L</td> <td>B</td> <td>R</td> </tr> <tr> <td>1714</td> <td>1181</td> <td>2018</td> <td>994</td> </tr> </table>	T	L	B	R	1783	1911	2139	1595	T	L	B	R	1714	1181	2018	994	<p>Date Taken 3/24/2010 10:00:57 AM</p> <p>Camera Mfg/Model Canon/Canon PowerShot G11</p> <p>Wind Direction SW Wind Speed 10</p> <p>Temperature 60 Rel Humidity 38</p> <p>Wet Bulb Temp 34</p>
T	L	B	R																
1783	1911	2139	1595																
T	L	B	R																
1714	1181	2018	994																
 <p>IMG_0224.JPG</p>	85	Foreground Coordinates <table border="1"> <tr> <td>T</td> <td>L</td> <td>B</td> <td>R</td> </tr> <tr> <td>1732</td> <td>1917</td> <td>2124</td> <td>1583</td> </tr> </table> Background Coordinates <table border="1"> <tr> <td>T</td> <td>L</td> <td>B</td> <td>R</td> </tr> <tr> <td>1703</td> <td>1291</td> <td>2093</td> <td>1033</td> </tr> </table>	T	L	B	R	1732	1917	2124	1583	T	L	B	R	1703	1291	2093	1033	<p>Date Taken 3/24/2010 10:01:20 AM</p> <p>Camera Mfg/Model Canon/Canon PowerShot G11</p> <p>Wind Direction SW Wind Speed 10</p> <p>Temperature 60 Rel Humidity 38</p> <p>Wet Bulb Temp 34</p>
T	L	B	R																
1732	1917	2124	1583																
T	L	B	R																
1703	1291	2093	1033																

Reaching Out in the Distance



*EPA ALT 082, Distance only limited by
Optical Zoom Capability*

Sun Angle, Background, Weather All Make a Difference



All these Images are the Same Opacity - 50%



Downloads: 468



Our Services

Visible Emissions Service

The Visible Emissions Service business unit is focused on helping customers achieve compliance with the myriad of environmental regulations in a cost effective and economically justifiable manner. [More Information...](#)

Spatial Services

The Spatial Services business unit is focused on all aspects of spatial and mapping services related to GIS/GPS system development, integration, design and technologies. [More Information...](#)

Sustainable Services

The Sustainable Services business unit specializes in the implementation and execution of sustainable infrastructure. [More Information...](#)

Welcome to Virtual Technology LLC

Virtual Technology LLC (VT) pioneers local compliance-focused monitoring techniques as well as regional, national, and international impact assessments as relates to Hazard Mitigation and Sustainable Infrastructure. The VT product line included automated US EPA Method 9, and Digital Camera Opacity Techniques as specified by US EPA Alternative Method 082 and ASTM D7520. Automating Method 9 is performed using Smart Phones, to generate forensically solid digital records of a visible emission observation. Automated Method 9 is available in the Google Play store. Expanding on Automated Method 9, allows the user to incorporate the use of Digital Cameras, to capture Digital Images of the emission source. Digital Camera Opacity measurement is available for Stationary and Fugitive emission sources offering the most credible evidence of opacity measurement available today.

VTLLC was awarded its first Research and Development contract with the US Department of Defense in March of 2006, to develop an automated means to measure visible emissions. This project has generated the automated Method 9 hand held application, the Digital Camera Opacity Technique, (ASTM D7520), the support data for the US EPA Alternative Method 082, and the Digital Opacity Compliance System Second Generation Software as a Service (DOCS II SaaS). Learn more about [DOCS II SaaS](#).

Have a bug or an issue to report? [Report it here.](#)



EPA Approval Letter

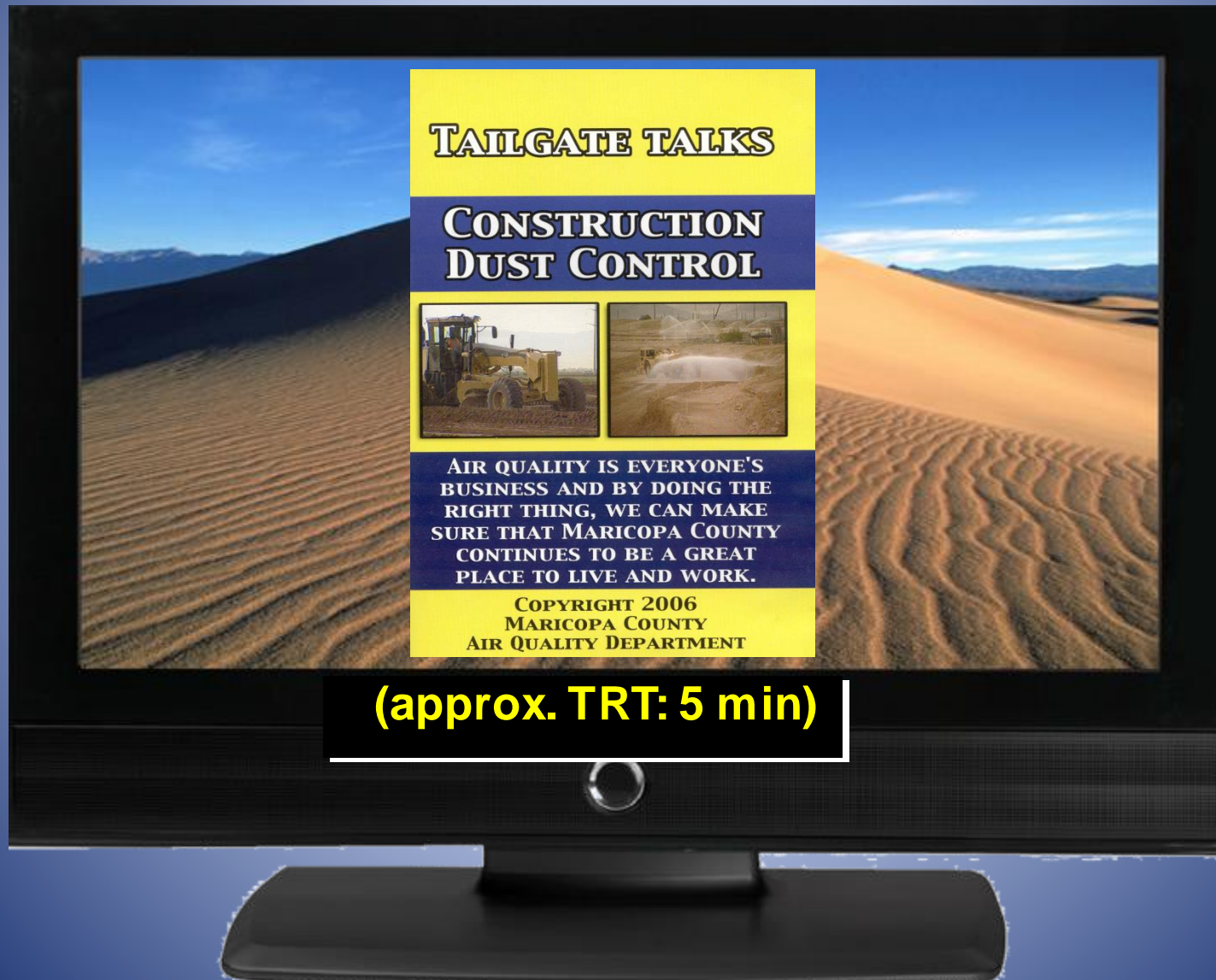
ASTM D7520-09 Summary

Visible Emission Eval. Procedures

DOCS II SaaS Presentation

Construction Dust Control Video

Presented in cooperation with the
Maricopa County Air Quality Department



(approx. TRT: 5 min)



❖ **COMMUNITY
OUTREACH**

Community Outreach

- Federal
- State
- Local Air Districts



AIRNOW

A New Way to Look at the Atmosphere

Template Presentation for
Regional Toolkit



What is *AIRNOW*?

- Cooperative effort between U.S. EPA, NPS, state and local air agencies to collect, quality assure, and transfer real-time and forecast air quality information to the public
- Utilizes the **Air Quality Index (AQI)**; a national reporting program that links air quality levels to cautionary health messages
- Fast and easy access for the media to deliver understandable air quality information that will help the public make good health-based decisions about their daily activities

U.S.EPA AIRNOW

❖ <http://www.airnow.gov/>

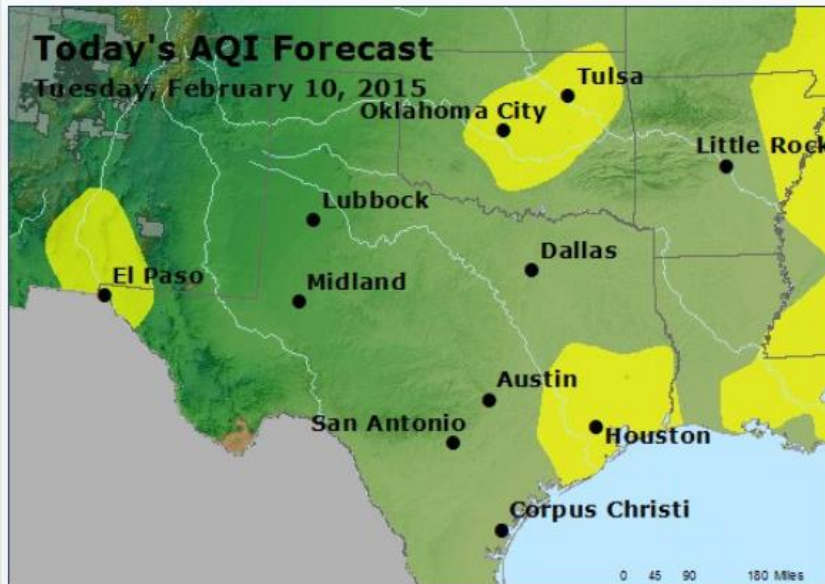
The screenshot displays the AirNow website interface. At the top left is the AirNow logo. To its right is a search bar with a "Go" button. Below the search bar is a "Local Air Quality Conditions" section with a "Zip Code:" input field, a "Go" button, a "State:" dropdown menu currently set to "Alabama", another "Go" button, and a "National Summary" link. Below this is a navigation bar with tabs for "Forecast", "Current AQI", "AQI Loop", and "More Maps". The main content area features a large map titled "Today's AQI Forecast" for "Tuesday, February 10, 2015". The map shows the United States with various regions colored in shades of green and yellow, indicating different AQI levels. Below the map are small inset maps for "Alaska", "Hawaii", "Mexico City", and "Puerto Rico". A timestamp "Generated: 2015-02-11 02:31:03Z" is visible at the bottom right of the map. To the right of the map is a "Fires: Current Conditions" section with a "Click to see map" link. Below that is an "Announcements" section with two entries: "02/03/15: Updated [Ozone Facts](#) webpage." and "11/04/14: Updated AirNow materials in Spanish- [Ozone and Your health](#) and [Guide to Air Quality for Ozone](#)", with a "more announcements" link. Further down is an "Air Quality Basics" section with links for "Air Quality Index", "Ozone", "Particle Pollution", "UV", "Smoke from fires", and "What You Can Do". Below this are "Health" and "Learning Center" sections. At the bottom of the page are icons for "Apps" and "EnviroFlash Email".

 Go

Local Air Quality Conditions

Zip Code: Go State: Go[National Summary](#)[AirNow Home](#) >> **Oklahoma**Data courtesy of: [Oklahoma Department of Environmental Quality](#)

- Forecast**
- Current AQI
- AQI Loop
- More Maps



Click on the city name for more detailed information. printable summary	FORECAST		CURRENT AQI
	Tue Feb 10	Wed Feb 11	
Lawton	50	50	n/a
Oklahoma City	60	60	62
Tulsa	60	60	58



Quality of Air Means Quality of Life

[Local Forecasts
& Conditions](#)

National Overview

[Forecast](#)
[Particles Now](#)
[Ozone Now](#)
[Action Days](#)
[Archives](#)
[International](#)

[AQI Summary](#)

[About AIRNow](#)

Partners

[For Partners](#)
[List of Partners](#)

Air Quality Basics

[Air Quality Index](#)

Particle Pollution (PM10) and (PM2.5)

Particle pollution (also known as "particulate matter") in the air includes a mixture of solids and liquid droplets. Some particles are emitted directly; others are formed in the atmosphere when other pollutants react. Particles come in a wide range of sizes. Those less than 10 micrometers in diameter (PM10) are so small that they can get into the lungs, potentially causing serious health problems. Ten micrometers is smaller than the width of a single human hair.

- **Fine particles (PM2.5).** Particles less than 2.5 micrometers in diameter are called "fine" particles. These particles are so small they can be detected only with an electron microscope. Sources of fine particles include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes.
- **Coarse dust particles.** Particles between 2.5 and 10 micrometers in diameter are referred to as "coarse." Sources of coarse particles include crushing or grinding operations, and dust stirred up by vehicles traveling on roads.

For more information on particle pollution visit:



How is it being used? On Air



-Local/regional coverage

-National coverage



... and in Print

Buckeye skies

Hot, stagnant air resulted in central Ohio having some of the most unhealthy air quality in the country early this week.

OPEN AIR LEVELS



Tuesday



Wednesday



HEALTH EFFECTS

- Possible headaches and itchy eyes.
- Inhaling ozone can lead to chest pain, coughing, nausea, throat irritation and congestion. Ozone also may worsen asthma, bronchitis, heart disease and emphysema.
- Repeated exposure can weaken immune systems and cause permanent lung damage.

Source: U.S. EPA. www.epa.gov

OUTSIDE AIR QUALITY



INDOOR AIR QUALITY



• Looking better: Views over Columbus improved substantially from Tuesday's ozone alert to yesterday's cooler and clearer conditions.

City's ozone level hits U.S. high

Smog conditions worst in 15 years; Ohio EPA planning tougher standards

By Lauren McDowell
THE COLUMBUS JOURNAL

Smog, weather experts say, is a lot like instant food soup. If you don't stir things up, the whole mess boils low and stays there.

Hot, stagnant air in central Ohio this week created some of

the worst smog conditions the Ohio Environmental Protection Agency has seen in 15 years.

"What was going on was kind of the perfect storm of conditions," said meteorologist Stan Dye.

Central Ohio had the most unhealthy air in the nation on Monday and Tuesday, said Laura Kogrovski, spokeswoman for the Mid-Ohio Regional Planning Commission, which tracks ozone and smog levels.

Both were so high that those with breathing difficulties and

those simply exercising outside would have struggled, Kogrovski said.

It didn't help that the stagnant weather pattern led during the week, when the worst days are out on the roads, she said.

Ozone forms when gases, such as those emitted from cars, lawn mowers and gas-cleaning plants, react with the sun's rays. This, coupled with a lack of air movement and a temperature "hit" that traps gases close to Earth, can raise ozone levels.

Particulates such as soot and ash also are found in abundance during these weather conditions. They help create the haze over cities.

On Tuesday, just out of the blue, air monitors that record "very unhealthy" levels statewide went in Franklin County.

The readings don't necessarily mean that there is more pollution in central Ohio than the rest of the country, Dye said. Cities including New York and Los Angeles experienced

See OZONE Page A2

City	Forecast	High/Low	Wind	Clouds	Chance of Precip.
Pittsburgh	More clouds than sun	90/71			
Thursday	Isolated thunderstorms	85/68			
Friday	Scattered thunderstorms	88/68			
Saturday	Isolated thunderstorms	83/68			
AQI	Unhealthy				



Get the Tools You Need

- **www.epa.gov/airnow**
- At-a-glance messages
- Health messages and tips
- Web updates to materials you can use to talk about air quality
- National and regional real-time maps and graphics

AIRSHARE

<http://www.airshare.info/index.cfm/homepage.html>



About Search

Search AirShare

Go

New Account

Log In

Latest News

EPA to Hold Public Hearings on Clean Power Plan (July 24, 2014)

WASHINGTON - The U.S. Environmental Protection Agency (EPA) will hold four, two-day public hearings, across the country on the proposed Clean Power Plan during the week of July 28, 2014. The hearings will be held in Washington D.C., Atlanta, Denver and Pittsburgh, and will provide the opportunity for interested parties to comment on the proposed rule before it takes effect. The Washington D.C. hearing will be held on July 29 and 30 at the William Jefferson Clinton East Building, Room 1153, 1201 Constitution Avenue, NW, Washington, D.C. 20004.

MEDIA RSVP: All media who would like to attend the public hearing in Washington, D.C. should RSVP to press@epa.gov by 5 p.m. EDT on July 28, so we can include your name on our security list. Please bring picture identification and allow additional time to enter the buildings and go through security. A large number of attendees are expected, and space will be first-come, first-serve.

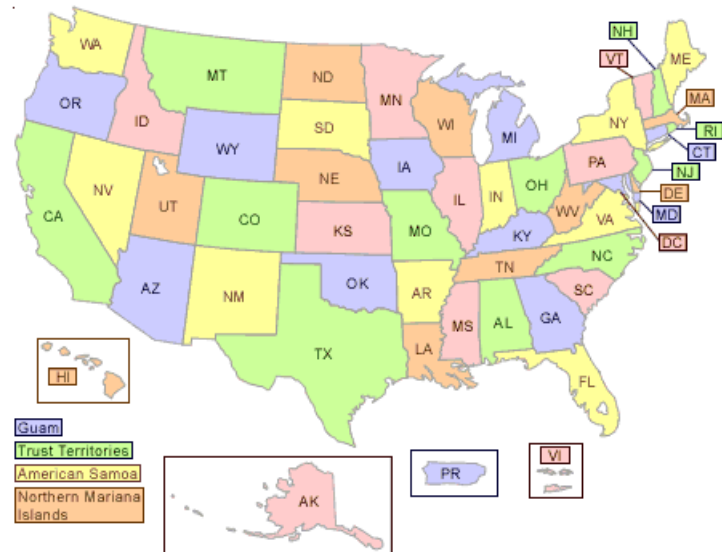
Speaking schedules will be posted prior to the meeting. More information about the hearing closest to you as well as what constitutes valid photo identification for entering federal facilities. Staff will be available to accommodate interested attendees who need assistance with federal ID requirements: <http://www2.epa.gov/carbon-pollution-standards/forms/public-hearings-clean-power-plan-proposed-rule>.

Instructions for submitting comments in writing: <http://go.usa.gov/XzNH>

EPA Seeks Applicants for Clean Air Excellence Awards (June 18, 2014)

EPA [announced](#) it is accepting applications for the 2015 Clean Air Excellence Awards. This awards program recognizes and honors

Air Quality Partners - Where you Live



[Federal Partners](#)

[Regional Partners](#)

[International Partners](#)

[National Organizations](#)

About AirShare

What is AirShare?

Airshare.info provides clean air partners, across the country, with a place to network and leverage ideas and information to purposefully and effectively meet the clean air goals of the 21st century. This site is administered by the Environmental Protection Agency (EPA) and the National Association of Clean Air Agencies (NACAA). This integrated website offers a state-of-the-art searchable database for easy accessibility to successful air quality improvement programs such as:

- [New Hampshire Clean School Bus Initiative](#)
- [Broward County Florida Conservation and Climate Change Challenge \(C3\) Toolkit](#)
- [Wisconsin DNR Activity Guide for 3rd&4th Graders "Air, Air Everywhere"](#)

Ground-level Ozone

[Contact Us](#) [Share](#)

Six Common Pollutants

Ground-level Ozone Home

Basic Information

Health Effects

Ecosystem Effects

Ozone Standards

Ozone Designations

Ozone Implementation

Regulatory Actions

Nonattainment Areas

Ozone Reduction Strategies

Air Quality Trends

Air Emission Sources

Resources

State Implementation Plan Status and Information

You are here: [EPA Home](#) » [Air & Radiation](#) » [Six Common Pollutants](#) » [Ozone Reduction Strategies](#) » [Where You Live](#) » Kentucky

Ozone Reduction Strategies – Where You Live – Kentucky

[Introduction](#)[Where You Live](#)[Tips to Reduce Ozone](#)[Funding](#)[Information Toolkit](#)[EXIT Disclaimer](#)

NOTE: Many links on this page are pointers to other hosts and locations on the Internet. This information is provided as a service; however, the U.S. Environmental Protection Agency does not endorse, approve or otherwise support these sites.

EPA Region 4: AL, FL, GA, KY, MS, NC, SC, TN and 6 Tribes

Link: <http://www.epa.gov/region4/air/naaqs/index.htm>

State:

Commonwealth of Kentucky, Energy and Environment, Department of Environmental Protection, Division of Air Quality

Link: <http://air.ky.gov/Pages/default.aspx>

Facebook: <http://www.facebook.com/pages/Commonwealth-of-Kentucky/69424894772?ref=search>

Twitter: <http://twitter.com/kygov>

Kentucky Transportation Cabinet (KYTC), Air Quality

Link: http://www.planning.kytc.ky.gov/modal_programs/air_quality.asp

Facebook: <http://www.facebook.com/pages/Frankfort-KY/Kentucky-Transportation-Cabinet/51991212260?v=wall>

Twitter: <http://twitter.com/KYTC>

Twitter: <http://twitter.com/KYTCminute>

Local:

Lexington Area Air Quality Program

Link: <http://www.lexingtonky.gov/index.aspx?page=618>

Facebook: <http://www.facebook.com/pages/Lexington-KY/191947568058>

Fugitive Dust

Search

[Advanced search](#)

Search all EPA this area

All results

[Documents](#)

[Web pages](#)

Sort by

Relevance

[Date](#)

Results **1 – 20** of **1,670** for **"Fugitive Dust"** within all areas of EPA.

Search for the terms ***Fugitive AND Dust*** occurring separately.

[Fugitive Dust Control Plan](#)

2014-09-02

<http://www.epa.gov/reg5oair/tribes/lac-du-flam-pdfs/crusher...>

Page 1.)) J. **Fugitive Dust** Control Plan Site Roadways I Plant Yard

A. The dust on the site roadways/plant yard shall be ...

[Crusher EPA NSR Indian Country](#)

2014-09-02

<http://www.epa.gov/reg5oair/tribes/lac-du-flam-pdfs/crusher...>

... Code) (2) If the permittee develops its own **Fugitive Dust** Control Plan, it shall identify the specific measures to be taken to prevent **fugitive dust** and ...

[\[More results from www.epa.gov/reg5oair/tribes/lac-du-flam-pdfs\]](#)

[Chapter 13: Miscellaneous Sources, AP 42, Fifth Edition ...](#)

2014-08-19

<http://www.epa.gov/ttn/chief/ap42/ch13/>

... Final Section - Supplement B, October 1996 (PDF 99K); Related Information. 13.2, Introduction to **Fugitive Dust** Sources. ...

[How is Pet Coke Regulated?](#)

<http://www2.epa.gov/petroleum-coke-chicago/how-pet-coke-reg...>

No emission standards apply specifically to the storage and handling of petroleum coke, but National Ambient Air Quality Standards (NAAQS) for particulate matter (PM10) do apply, so states have regulations as part of their Air State Implementation Plan.

SMOGCITY

❖ www.smogcity.com

You Can Make Smog City and the World a Better Place!

Home
Run Smog City
Visitors Tour Guide
What You'll Learn
What's Ozone
What's the AQI
What You Can Do
Smog City Science
Educational Links
Acknowledgments
Download
Help
Send Comments

Welcome!

SEE
how your actions affect ozone levels

FIND
out how weather controls ozone

LEARN
how ozone affects your health

SMOG CITY AQI

how you can see for yourself how our choices affect air quality

THE POWER TO CONTROL AIR POLLUTION IS IN YOUR HANDS

Smog City is an interactive air pollution simulator that shows how your choices, environmental factors, and land use contribute to air pollution. In Smog City you're in control so your visit can be a healthy or unhealthy experience depending on the decisions you make. You'll see how ground-level ozone, the biggest part of summertime smog, increases or decreases when you spend a day in Smog City. And since ozone can irritate respiratory systems, cause breathing difficulty, coughing, and chest pain, knowing how and why ozone forms and what you can do about it is important to the residents of Smog City and everyone else on the planet.

Cautionary Note:
Relationships between ozone, emissions, and weather conditions are very complex. Because Smog City's relationships are based on a simplified model of complex atmospheric processes in Sacramento, California, there is no guarantee that they are scientifically accurate for this or other regions. Results only illustrate general behavior of air pollution processes, and cannot be used for any quantitative purpose or in detailed planning of future control strategies.

Minimum Requirements
IE 3.0 or Netscape 3.0
800 x 600 pixels



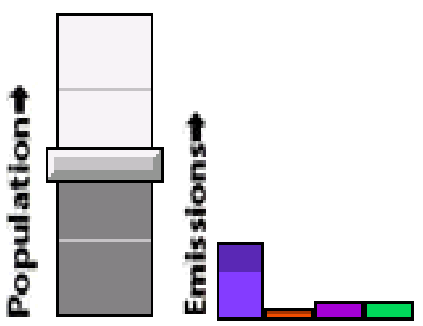
Select Weather Conditions



HEALTH EFFECTS AT PEAK OZONE LEVEL

Good

Select Population Level



Select Emissions Levels

Cars and Trucks Off Road Industry Consumer Products

- Home
- Run Smog City
- Visitors Tour Guide
- What You'll Learn
- What's Ozone
- What's the AQI
- What You Can Do
- Smog City Science
- Educational Links
- Acknowledgments
- Download
- Help
- Send Comments

States

- Alaska
- California
- Nevada
- Arizona
- Michigan
- New Mexico

CA. AIR RESOURCES BOARD

❖ <http://www.arb.ca.gov/html/brochure/pm10.htm>

The screenshot shows the California Air Resources Board website. The header includes the CA.GOV logo, the California Environmental Protection Agency logo, and the Air Resources Board logo. Navigation links include Home, Reducing Air Pollution, Air Quality, Business Assistance, and Laws & Regulations. The main content area is titled 'Air Pollution - Particulate Matter Brochure' and includes a date stamp 'Thursday, July 5, 2012'. A sidebar on the left contains 'UP LINKS' and 'PROGRAM LINKS'. The main text discusses 'What is Particulate Matter (PM10)?' and 'Where does PM10 come from?'. A search bar is visible in the top right corner.

California Environmental Protection Agency
Air Resources Board

About ARB | Calendars | A-Z In

Home | Reducing Air Pollution | Air Quality | Business Assistance | Laws & Regulations

Thursday, July 5, 2012

Air Pollution - Particulate Matter Brochure

This page last reviewed May 6, 2009

What is Particulate Matter (PM10)?

Particulate matter (PM10) pollution consists of very small liquid and solid particles floating in the a to public health are the particles small enough to be inhaled into the deepest parts of the lung. The than 10 microns in diameter - about 1/7th the thickness of the a human hair - and are known as P fine particulate matter known as PM2.5.

PM10 is a major component of air pollution that threatens both our health and our environment.

Where does PM10 come from?

In the western United States, there are sources of PM10 in both urban and rural are as, major sou

- 1. Motor vehicles.
- 2. Wood burning stoves and fireplaces.
- 3. Dust from construction, landfills, and agriculture.
- 4. Wildfires and brush/waste burning.
- 5. Industrial sources.
- 6. Windblown dust from open lands.

UP LINKS

- ◊ Reducing Air Pollution - ARB Programs
 - ◊ **Particulate Matter Program**

PROGRAM LINKS

- ◊ Additional Information
- ◊ Background
 - ◊ General
 - ◊ SB 656
- ◊ Related Links
- ◊ What's New
 - ◊ General
 - ◊ SB 656
- ◊ Workshops / Meetings
 - ◊ SB 656

Local Districts

- San Joaquin AQMD, California
- South Coast AQMD, California
- Clark County DEQ, Nevada
- Pima County DEQ, Arizona
- Maricopa County DEQ, Arizona
- Albuquerque, New Mexico

Fugitive Dust Control for Agriculture

Fugitive Dust Control for Agriculture

Introduction

- Part I – Emissions Control Methods and Cost Effectiveness
- Part II – Conservation Management Practice Plan Program and Lessons Learned

Target Markets

- ▣ Landowners
- ▣ Contractors/subcontractors/developers
- ▣ Off-road vehicle enthusiasts
- ▣ Landscape companies, apartment complexes
- ▣ Haul and street cleaning companies
- ▣ Government agencies
- ▣ Schools/youth
- ▣ General public
- ▣ Media

❖ Background

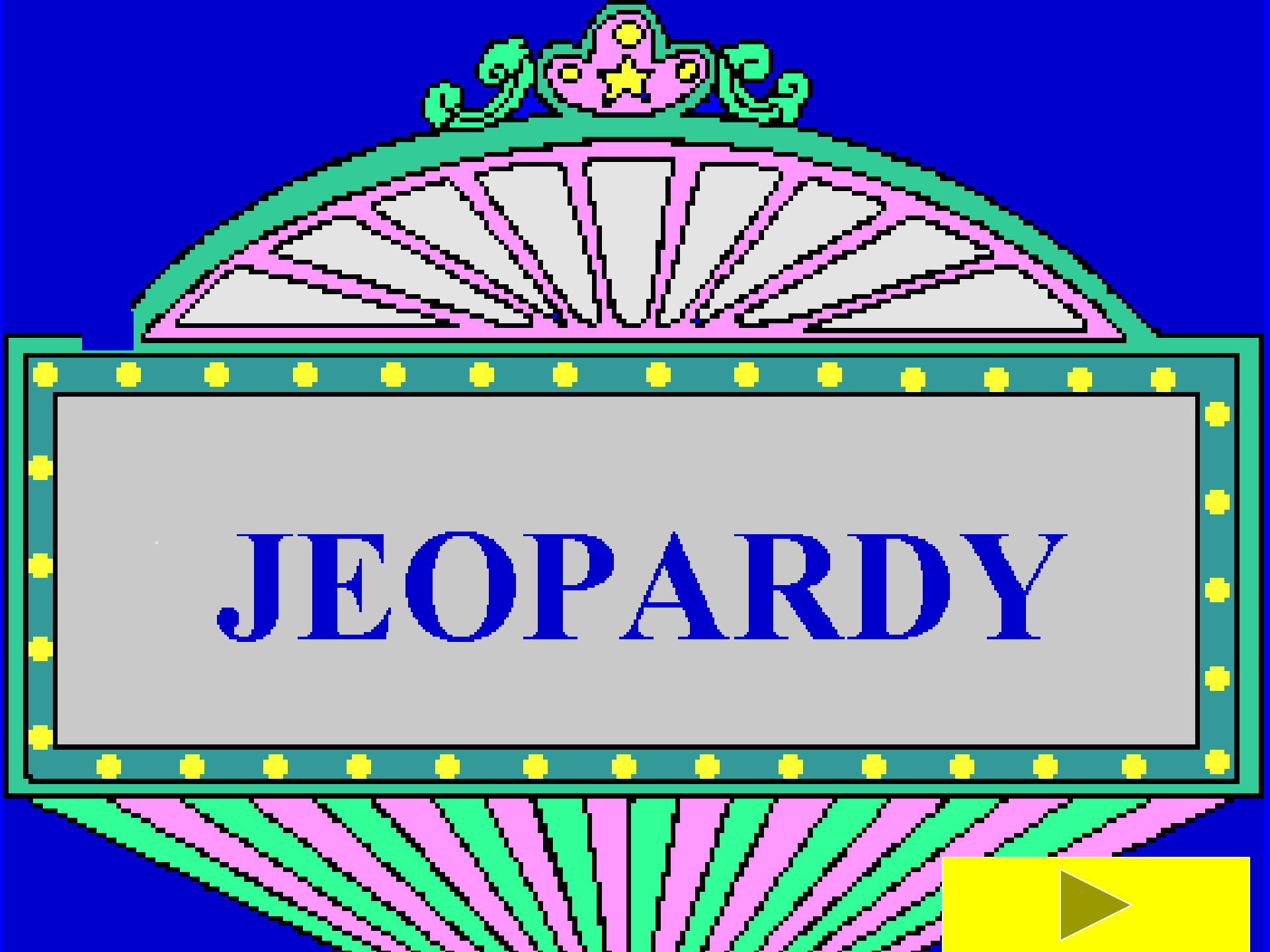
Why Educate About PM10?

- Regulatory requirements
- **HEALTH EFFECTS**
 - *Breathing difficulties*
 - *Heart attacks*
 - *Premature death*



QUESTIONS ?



The image features the classic Jeopardy! logo. At the top is a pink decorative flourish with a yellow star. Below it is a semi-circular arch with a pink and white striped pattern. A teal border with yellow stars surrounds a central grey rectangle containing the word "JEOPARDY" in blue, serif, all-caps font. At the bottom, a pink and white striped pattern mirrors the arch above. A yellow play button icon is in the bottom right corner.

JEOPARDY

Jeopardy

Final Jeopardy

PM10 Health Effects	Control Measures	Rules and Regs	Test Methods	Fugitive Dust Sources
<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>
<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>
<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>
<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>

PM10 Health Effects **.....for 10**

One millionth of a meter

PM10 Health Effectsfor 10

Micron



PM10 Health Effects **.....for 20**

The smallest part of the lungs

PM10 Health Effectsfor 20

Alveoli



PM10 Health Effects **.....for 30**

**Changes in blood pressure,
cell activity in the lungs
and heart function**

PM10 Health Effects **.....for 30**

**How particulates
can harm health**



PM10 Health Effects **.....for 40**

2.5 microns and 10 microns

PM10 Health Effectsfor 40

**Two regulated sizes of
particulate matter**



PM10 Health Effectsfor 50

AAQS

PM10 Health Effects **.....for 50**

Ambient Air Quality Standards



Control Measures **.....for 10**

**A metal grate that
removes caked dirt and
mud from trucks or a
forest animal**

Control Measuresfor 10

Grizzly



Control Measuresfor 20

**Water, hygroscopic
materials, and
chemical or organic
stabilization materials**

Control Measuresfor 20

Dust Suppressants



DAY

DOUBLE

Control Measuresfor 30

The vertical distance between the top edge of a cargo container area and the highest point at which the bulk material contacts the cargo container area

Control Measuresfor 30

Freeboard



Control Measuresfor 40

**Most expensive
control measure**

Control Measuresfor 40

Paving



Control Measuresfor 50

**This type of surface meets
one of the following:**

Visible Crust

Threshold Friction Velocity

Vegetative Cover

Control Measuresfor 50

Stabilized surface



Rules and Regulationsfor 10

**Any solid particulate matter
emitted into the ambient air
without first passing
through a stack or duct**

Rules and Regulationsfor 10

Fugitive Dust or Fugitive Emissions



Rules and Regulationsfor 20

VDE

Rules and Regulationsfor 20

Visible Dust Emissions



Rules and Regulationsfor 30

**Maximum allowed
posted speed limit for
unpaved roads on
construction sites**

Rules and Regulationsfor 30

15 MPH



Rules and Regulationsfor 40

Term for manmade dust

Rules and Regulationsfor 40

Anthropogenic

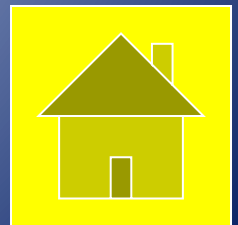


Rules and Regulationsfor 50

150 ug/cm³ over 24 hrs

Rules and Regulationsfor 50

Ambient Air Quality Standard for PM10



Test Methodsfor 10

Test method for
unpaved roads and
unpaved traffic areas

Test Methodsfor 10

“Visual Determination of Opacity”



Test Methodsfor 20

**VDE is limited to this
amount of emission**

Test Methodsfor 20

20% Opacity



Test Methodsfor 30

TFV

Test Methodsfor 30

Threshold Friction Velocity



DAY

DOUBLE

Test Methodsfor 40

**Two test methods
determined by using
ASTM Methods**

Test Methods
.....for 40

Determination of Soil Moisture”
and

“Determination of Silt
Content for Bulk Materials”



Test Methodsfor 50

Number degrees the sun
must be to your back
when conducting a VEE

Test Methodsfor 50

140⁰



Fugitive Dust Sourcesfor 10

**The category with the
largest percentage of
PM emissions**

Fugitive Dust Sourcesfor 10

Unpaved Roads



Fugitive Dust Sources **.....for 20**

Automobiles

Industrial Facilities

Disturbed Soil

Wood Burning

Fugitive Dust Sourcesfor 20

Manmade sources of Fugitive Dust



Fugitive Dust Sourcesfor 30

Construction activities

Disturbed vacant land

Unpaved roads

Trackout

Wind blown dust

Fugitive Dust Sourcesfor 30

Non-point Sources of Fugitive Dust



Fugitive Dust Sourcesfor 40

AADVT

Fugitive Dust Sourcesfor 40

**Annual Average
Daily Vehicle Trips**



Fugitive Dust Sources **.....for 50**

Any activity or portion of land associated with the commercial growing of crops or the raising of fowl or animals

Fugitive Dust Sourcesfor 50

Agricultural Source



Final Jeopardy Category

Prohibitory Rules

Final Jeopardy Question

Definitions

Exemptions

Standards or Requirements

Administrative Requirements

Recordkeeping

Test Methods

Final Jeopardy Answer

Typical Sections of a Rule

2012 PM_{2.5} NAAQS Implementation Timeline

Milestone	Date
EPA promulgates 2012 PM _{2.5} NAAQS rule	December 14, 2012
Issue Designations Guidance	April 16, 2013
States and tribes submit recommendations for PM _{2.5} designations to the EPA	No later than December 13, 2013
EPA notifies states/tribes re: any intended modifications to their recommendations (120-day letters)	No later than August 14, 2014 (120 days prior to final PM _{2.5} area designations)
EPA publishes public notice of state recs and EPA's intended modifications, if any; EPA initiates 30-day public comment period	No later than August 29, 2014
End of 30-day public comment period	No later than September 29, 2014
States/tribes submit additional information to respond to EPA's modification of a recommended designation	No later than October 29, 2014
EPA promulgates final PM _{2.5} area designations	December 2014 (effective early 2015)