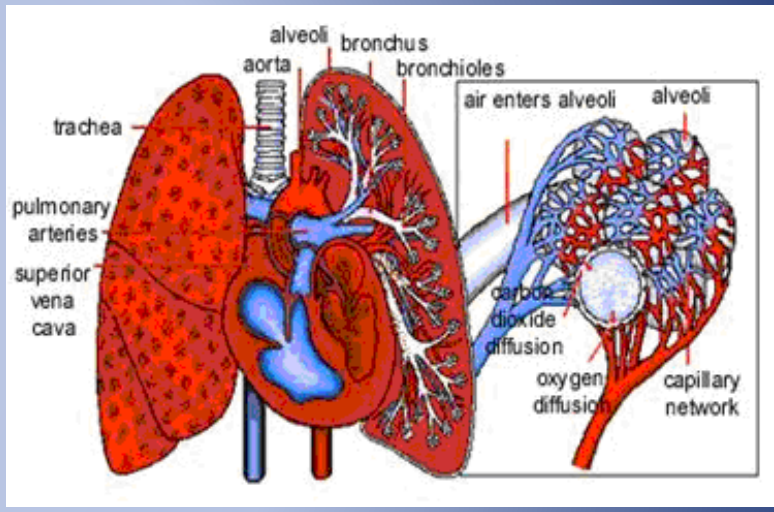
Fugitive Dust Control
NACT 252

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 µg/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 µg/m^3	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/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

as of October 201

*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

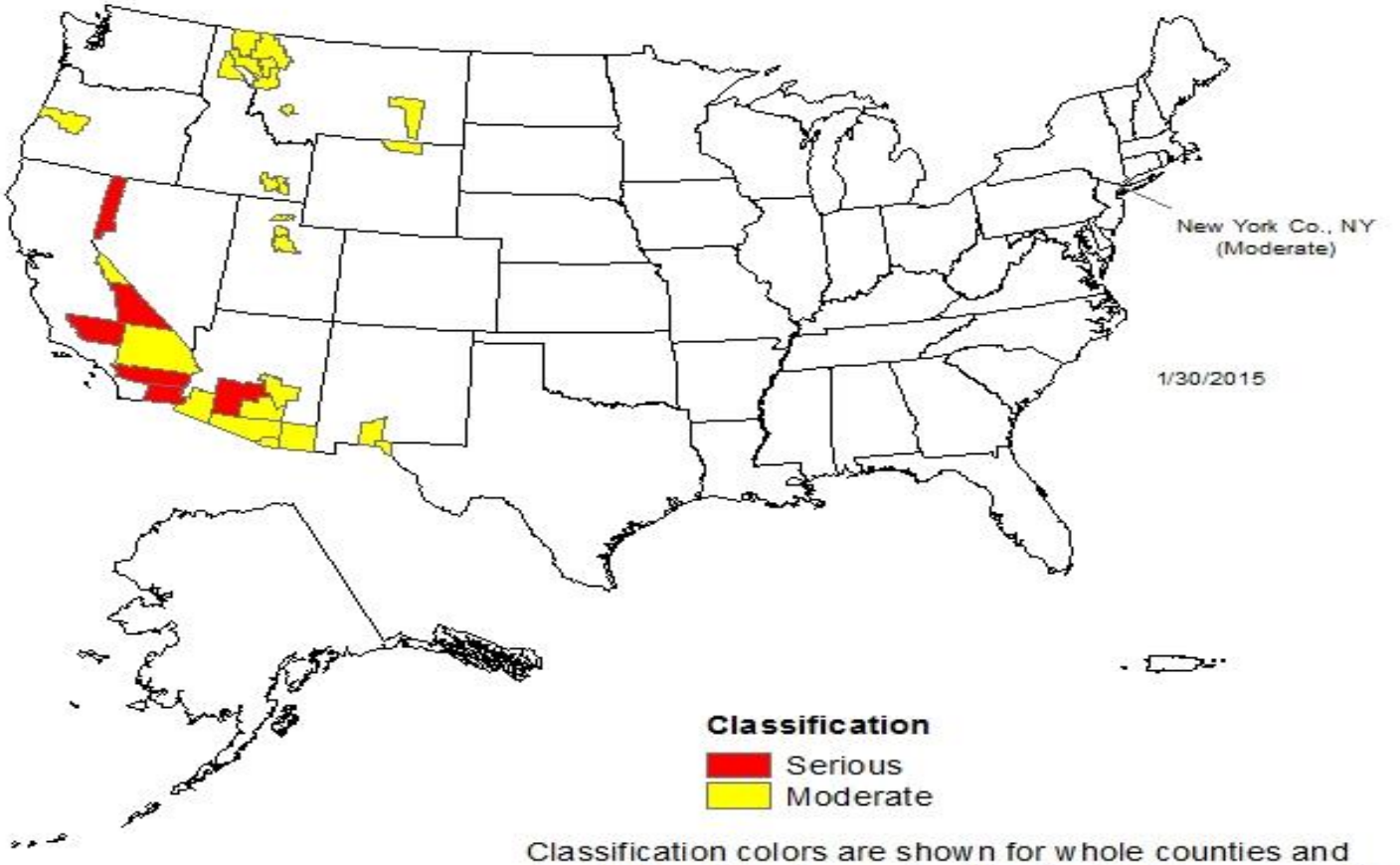
1. Bakersfield, CA
2. Fresno-Madera, CA
3. Hanford, CA
4. Los Angeles Region
5. Modesto, CA
6. Salt Lake City, UT
7. Pittsburgh, PA
8. Merced, CA
9. Fairbanks, AK

*American Lung Association "State of the Air" Report 2013

Classification of PM-10 Nonattainment Areas

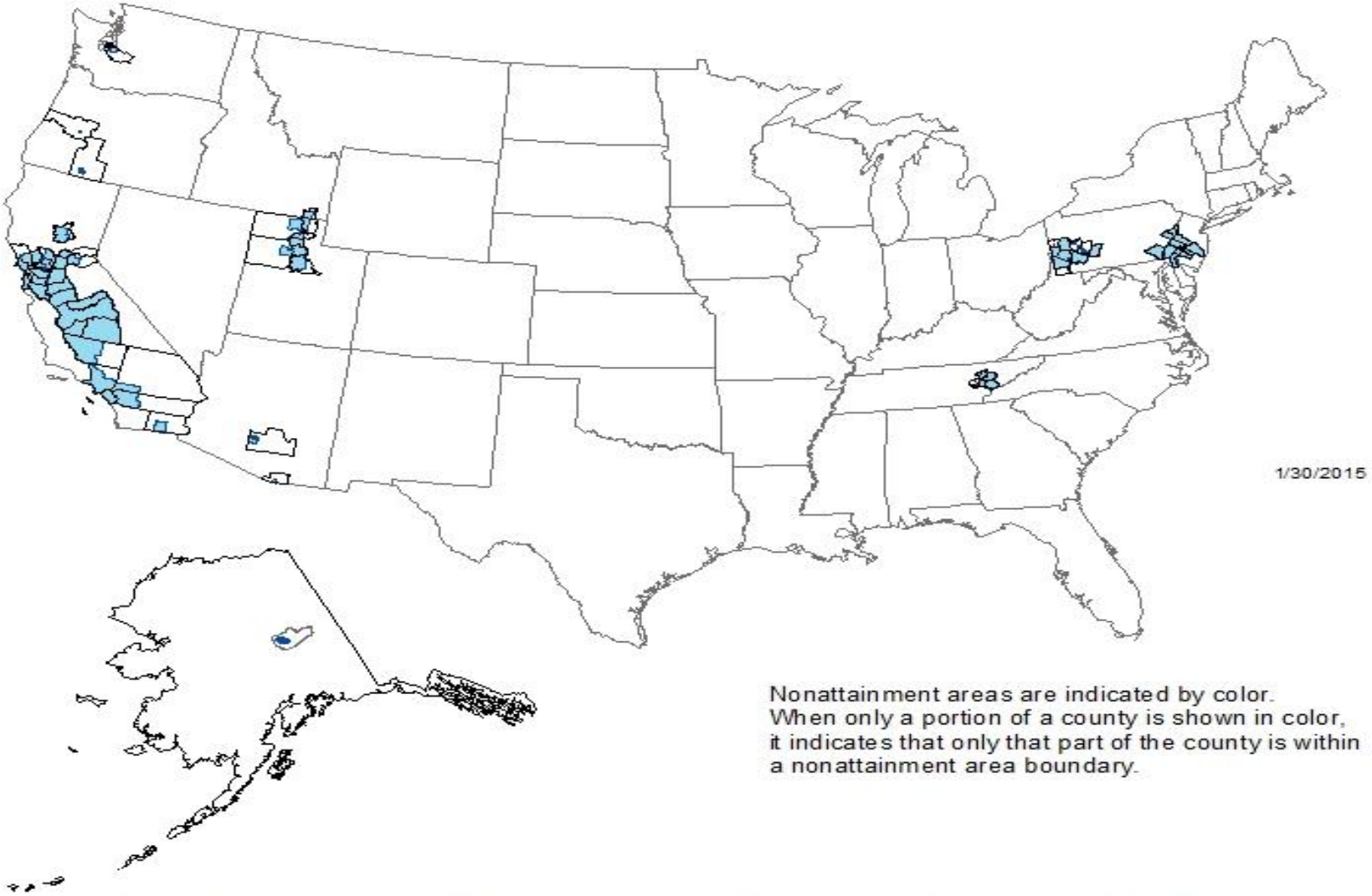
Serious	Moderate
Clark Co., NV	Ajo (Pima County), AZ
Coachella Valley, CA	Anthony, NM
East Kern Co, CA	Butte, Mt
Imperial Valley, CA	Columbia Falls, MT
Owens Valley, CA	El Paso Co, TX
Phoenix, AZ	Flathead County, Whitefish, MT
Washoe Co, NV	Fort Hall Indian Reservation, ID

Counties Designated Nonattainment for PM-10



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 µg/m^3 in 2020

7 counties are projected not to meet 12.0 µg/m^3 in 2020.

All of these are already under requirements to reduce $PM_{2.5}$.

Source: PM NAAQS RIA
For more information: www.epa.gov/pm

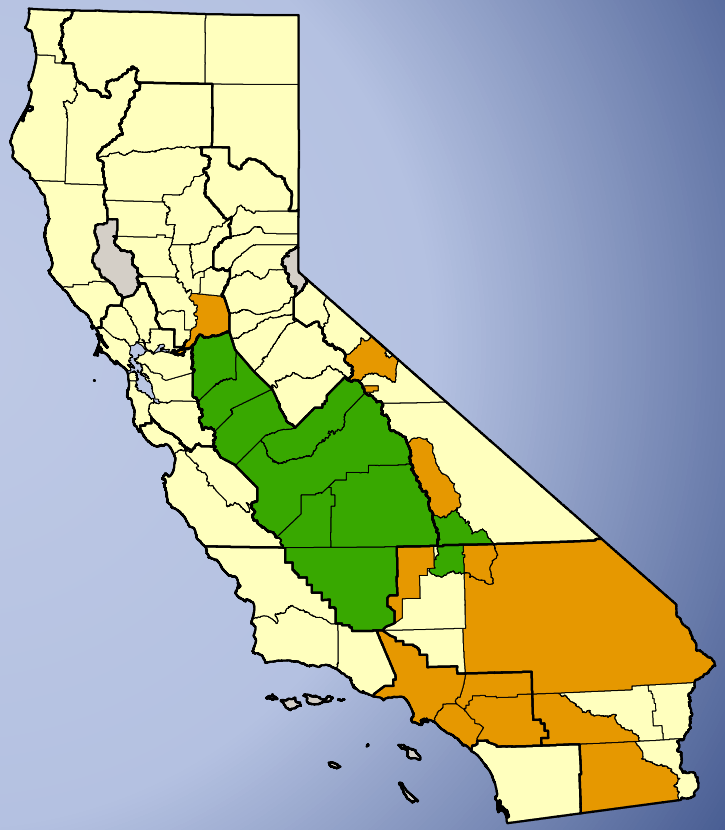
2012 $PM_{2.5}$ NAAQS Implementation Timeline

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



Attainment

Unclassified

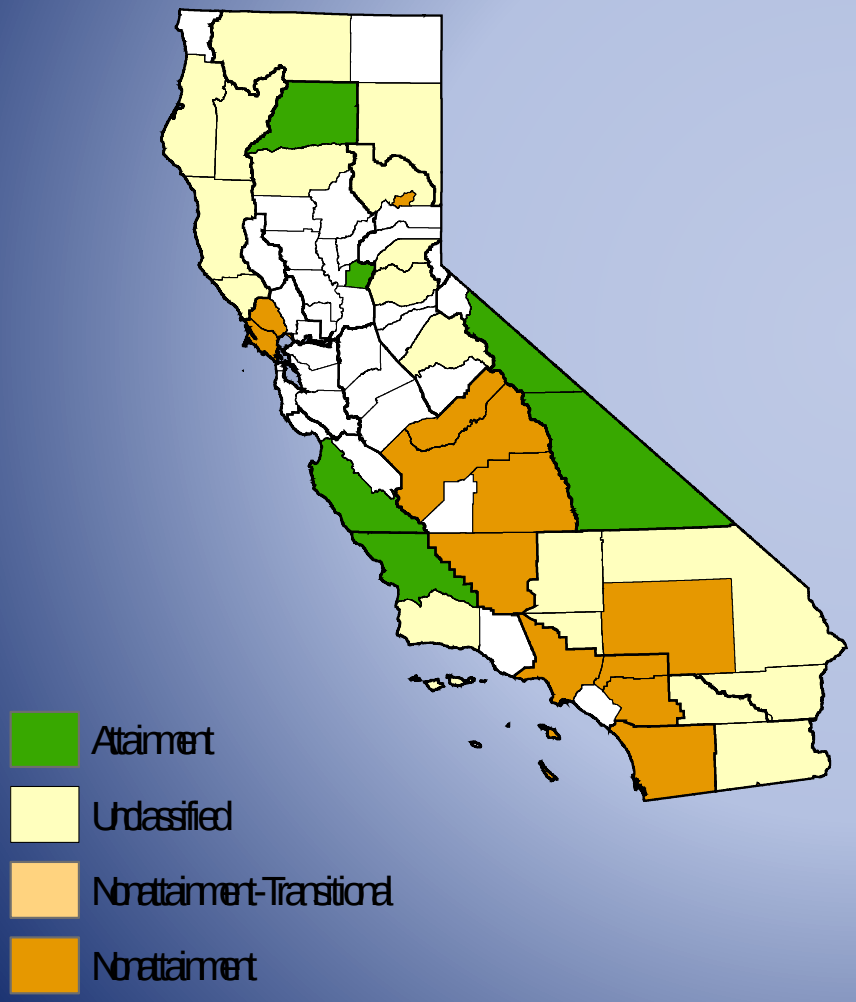
Nonattainment-Transitional

Nonattainment

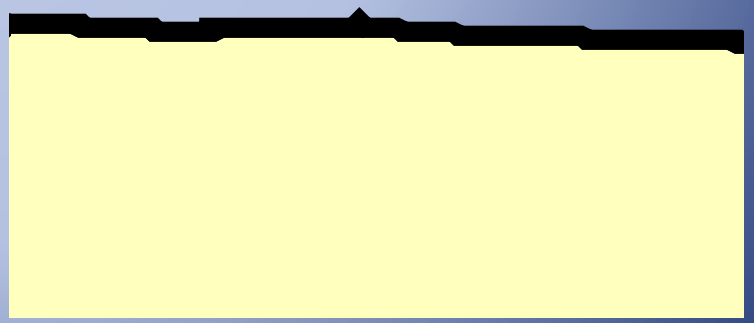
May 2011 Staff Report

2011 PM 2.5 Attainment Status

State



Federal



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

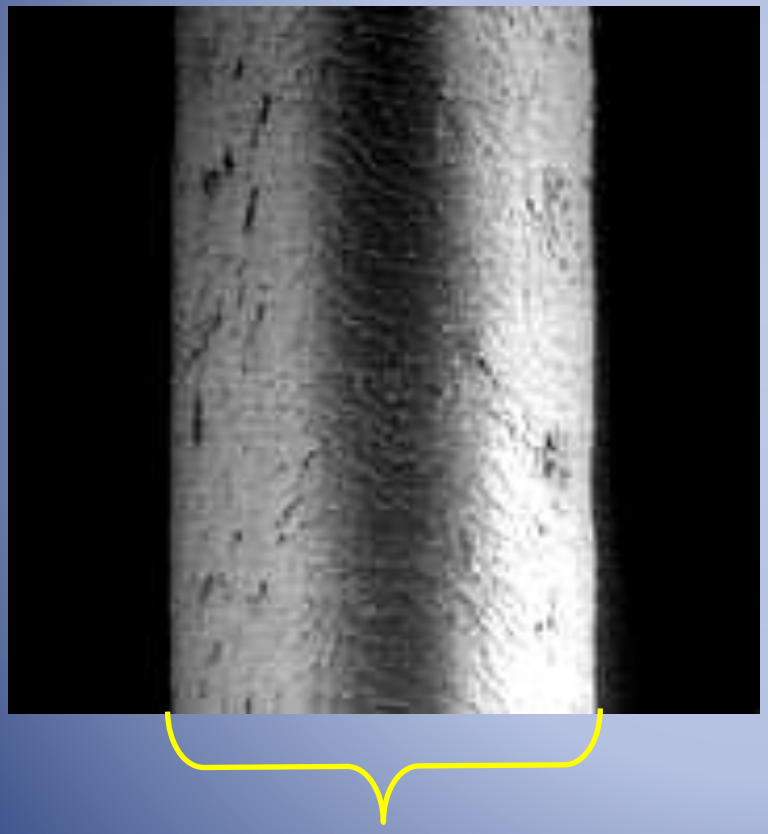
PM Source	Percent of PM10/day
Unpaved Road Dust	21%
Paved Road Dust	17%
Fires	14%
Windblown Dust	12%
Non-Anthropogenic (Wildfires)	10%
Construction/Demolition	8%
Farming Operations	7%
Vehicles	6%
Stationary Industrial Sources	5%
Total	100%

(ARB, Almanac Emissions Projection Data, 2013 Data)

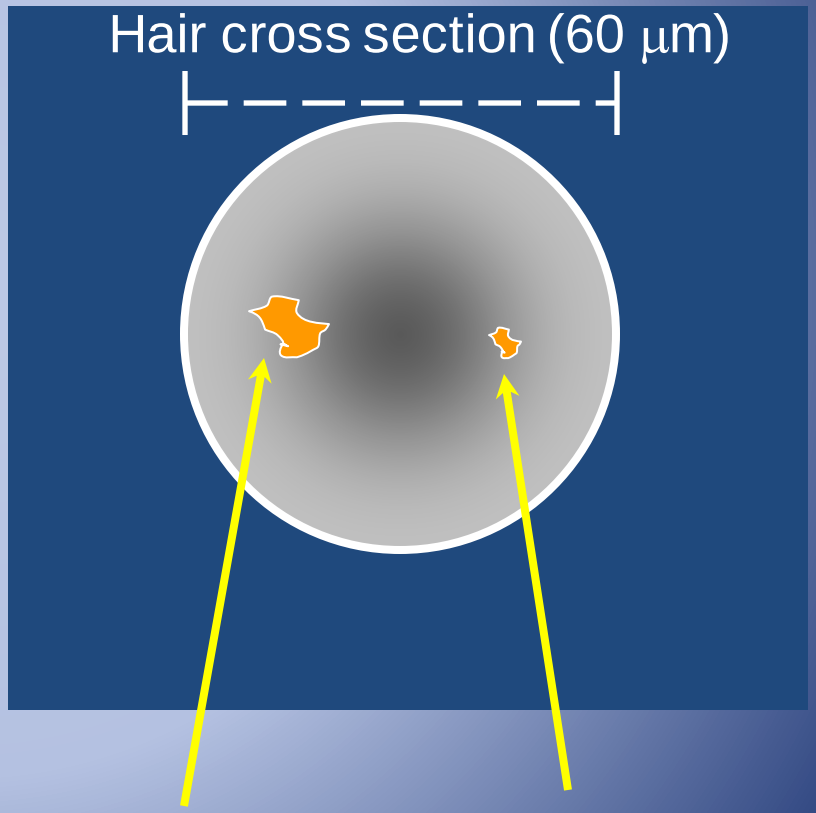

Fugitive Dust and
Particulate Matter
(PM10)

PM10

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



Human Hair
(60 μm diameter)



PM10
(10 μm)

PM2.5
(2.5 μμ)

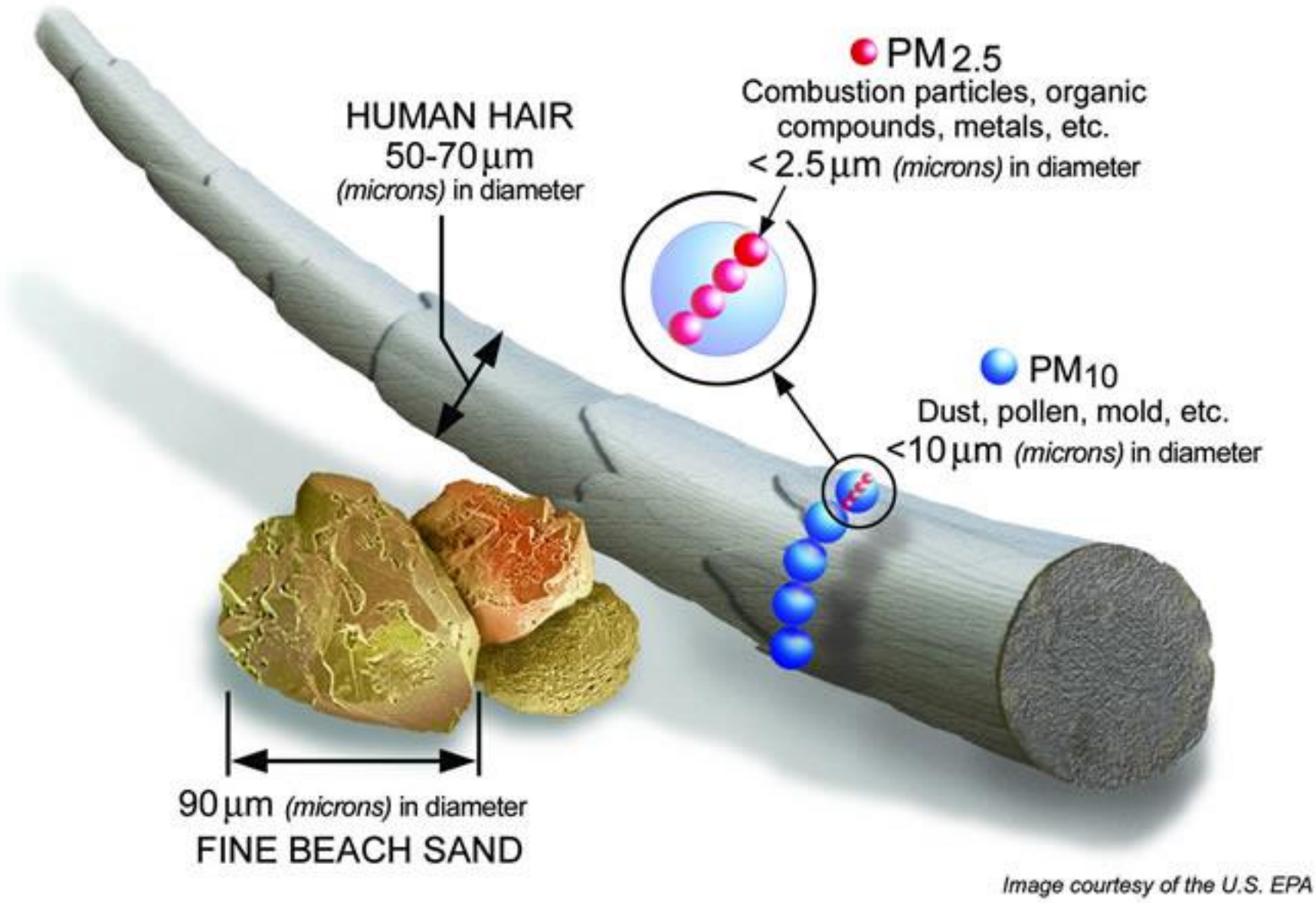
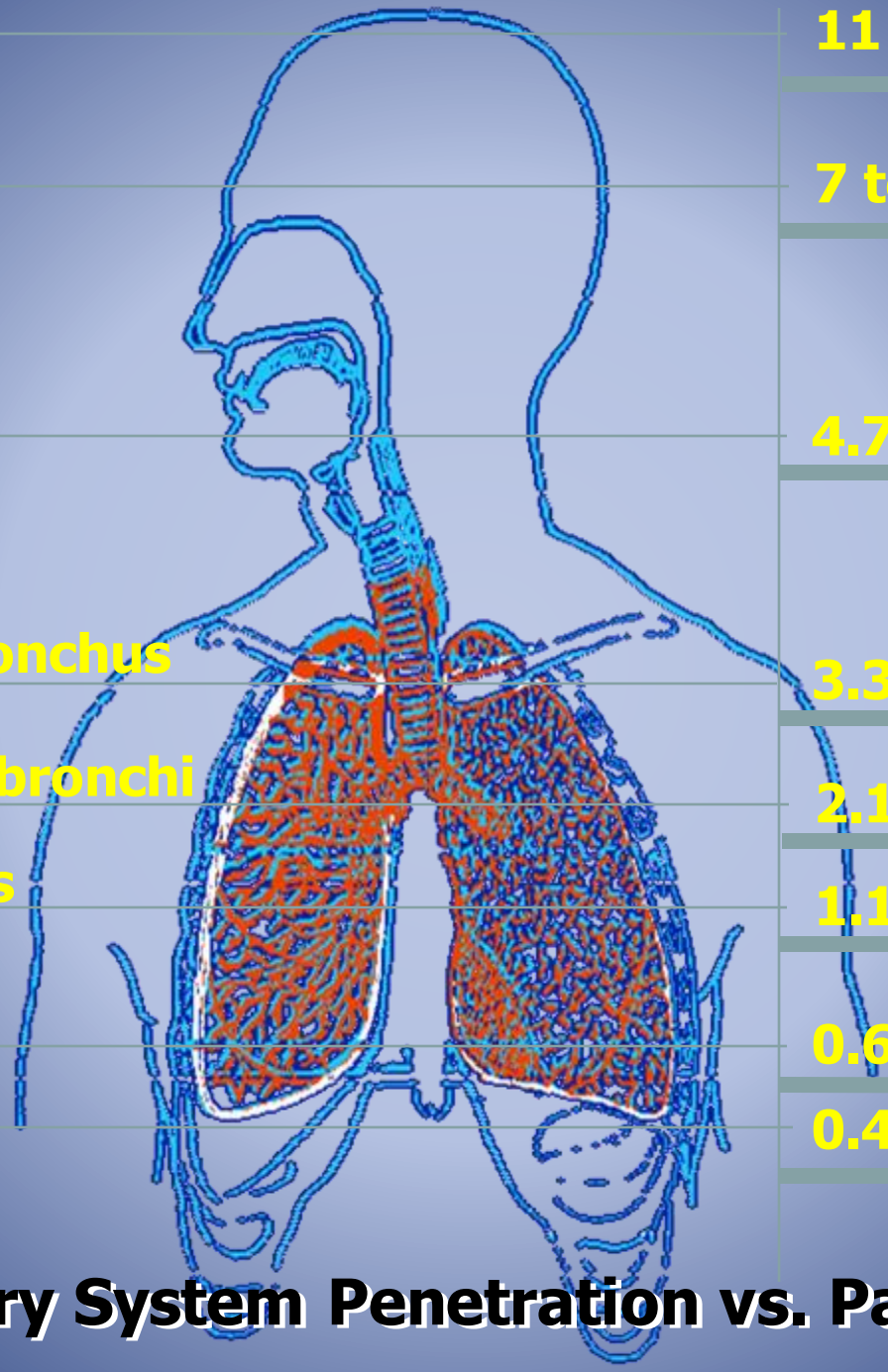


Image courtesy of the U.S. EPA

What are particles composed of?



Hair
Skin
Pharynx
Trachea
Primary bronchus
Secondary bronchi
Bronchioles
Alveoli

11 Microns and larger
7 to 11 Microns
4.7 to 7 Microns
3.3 to 4.7 Microns
2.1 to 3.3 Microns
1.1 to 2.1 Microns
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

Wind action

Forest Fires

Volcanoes

Man Made
(Anthropogenic)

Automobiles

Industrial Sources

Wood Burning

Disturbed Soil

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

- 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

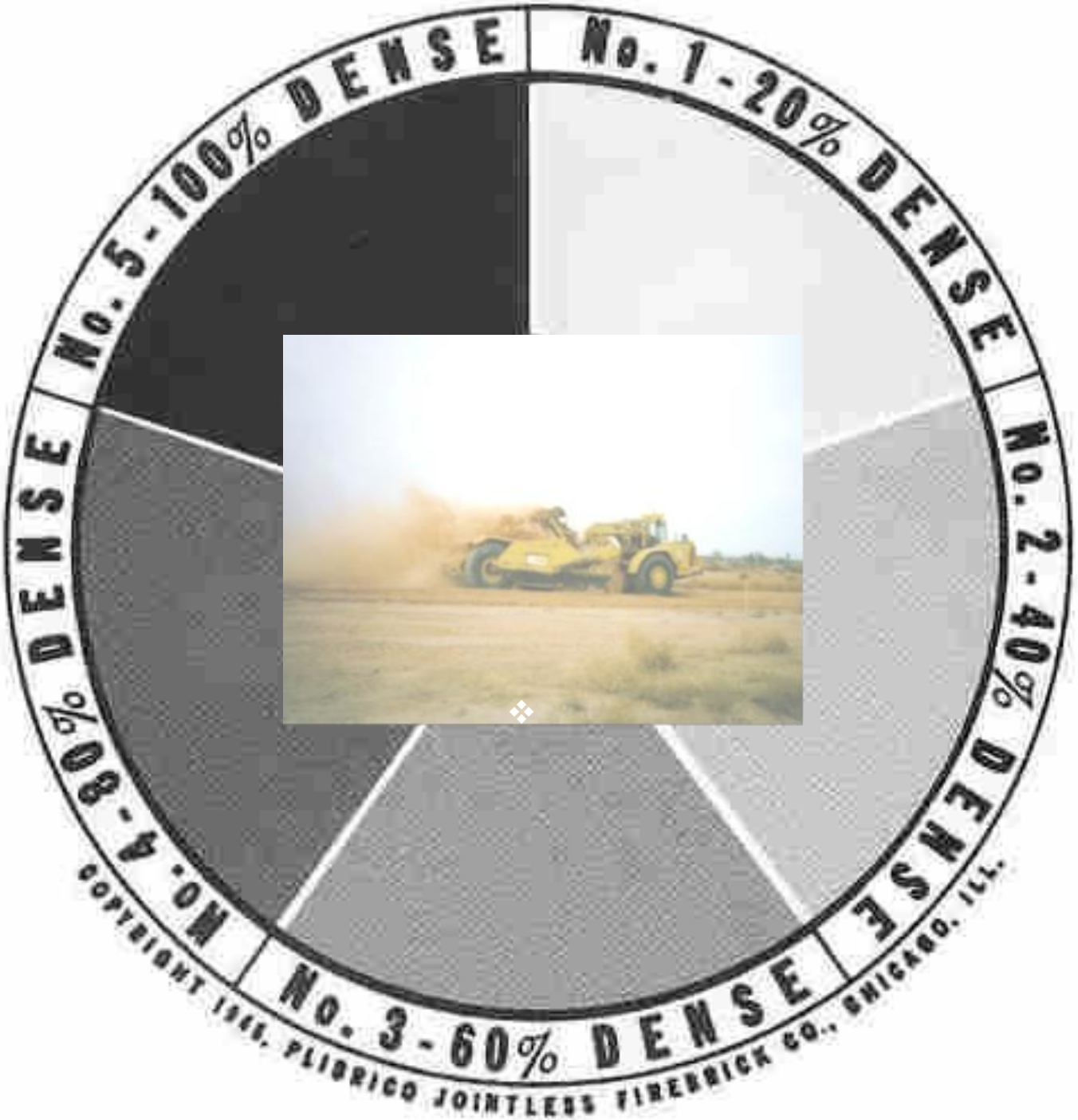
Two Basic Requirements

- 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


No. 1 - 20% DENSE
No. 2 - 40% DENSE
No. 3 - 60% DENSE
No. 4 - 80% DENSE
No. 5 - 100% DENSE
COPYRIGHT 1966, PLIBRICO JOINTLESS FIREBRICK CO., CHICAGO, ILL.

Definitions

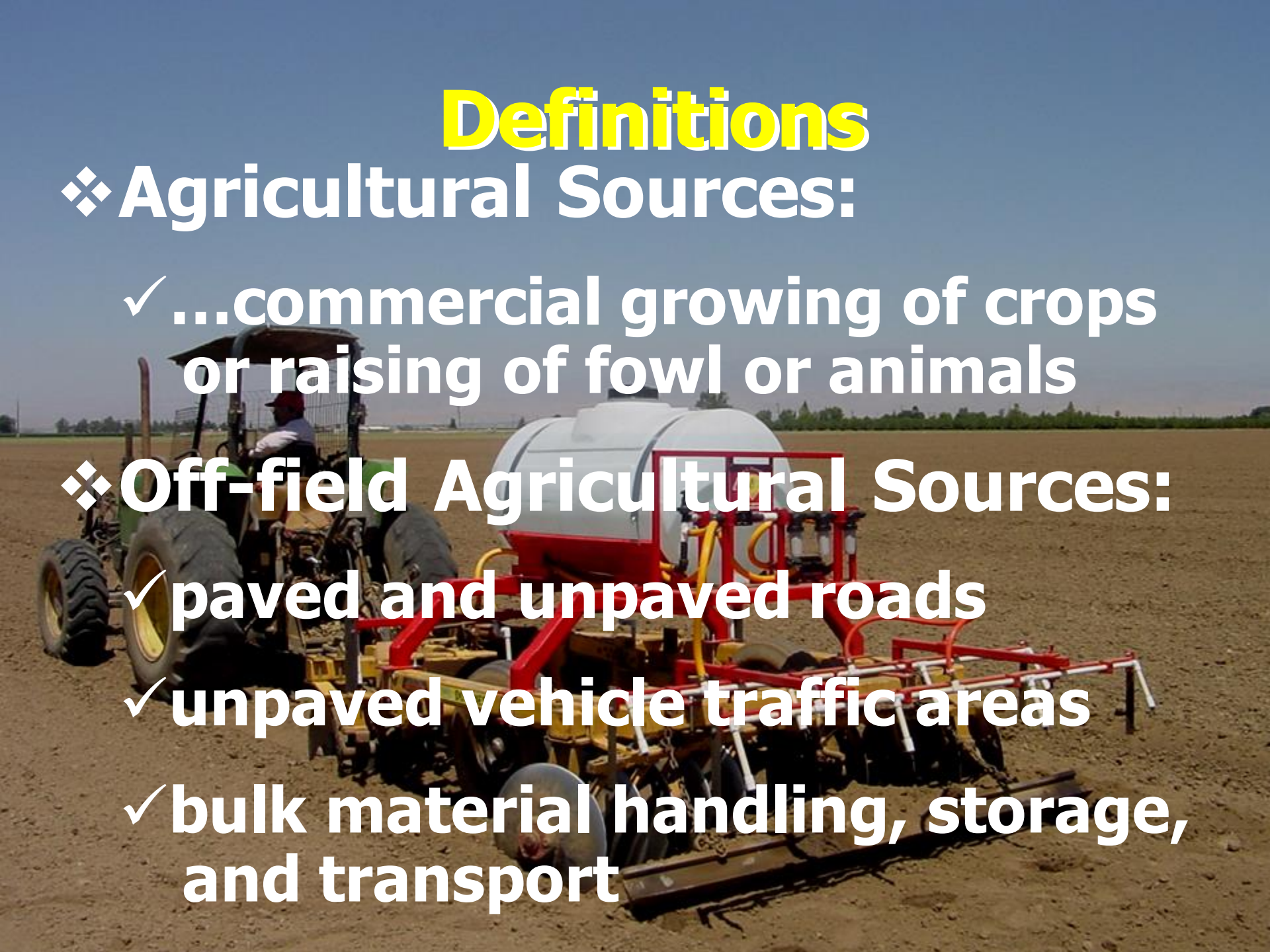
- **Bulk Material:**
  - ✓ **…any unpackaged material with a silt content of more than 5%**
- **Silt:**
  - ✓ **…any aggregate material with a particle size of < 75 micrometers in diameter, which passes through a No. 200 sieve**

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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Site Layout Sketch

Draw North Arrow

Sun

Wind

Emission Point

140°

Sun Location Line

3. Emissions Description (continued)

1. Excavator Front Shovel

2. Excavator Track Model

3. Excavator Wheel Model

4. Backhoe Loader

5. Trencher

6. Paddle Scraper

7. Scraper Wheel Tractor

8. Push-Pull Scraper

9. Wheel Tractors

10. Small Wheel Loader

11. Large Wheel Loaders

12. Track Loaders

13. Articulated Truck

14. Construction Truck

15. Haul Truck Rigid Frame

16. Skid Steer Loader (Bobcat)

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:** ☐ continuous ☐ 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 ☐NO ☐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


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1150


772


GVT
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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**


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Test Method For Unpaved Roads And Unpaved Traffic Areas

- Step 1:
  - At least 16.5’ from Dust Source
  - Sun 140^0 to Observer’s Back
  - Read Plume Perpendicular to Line of Vision
  - Only One Plume at a Time

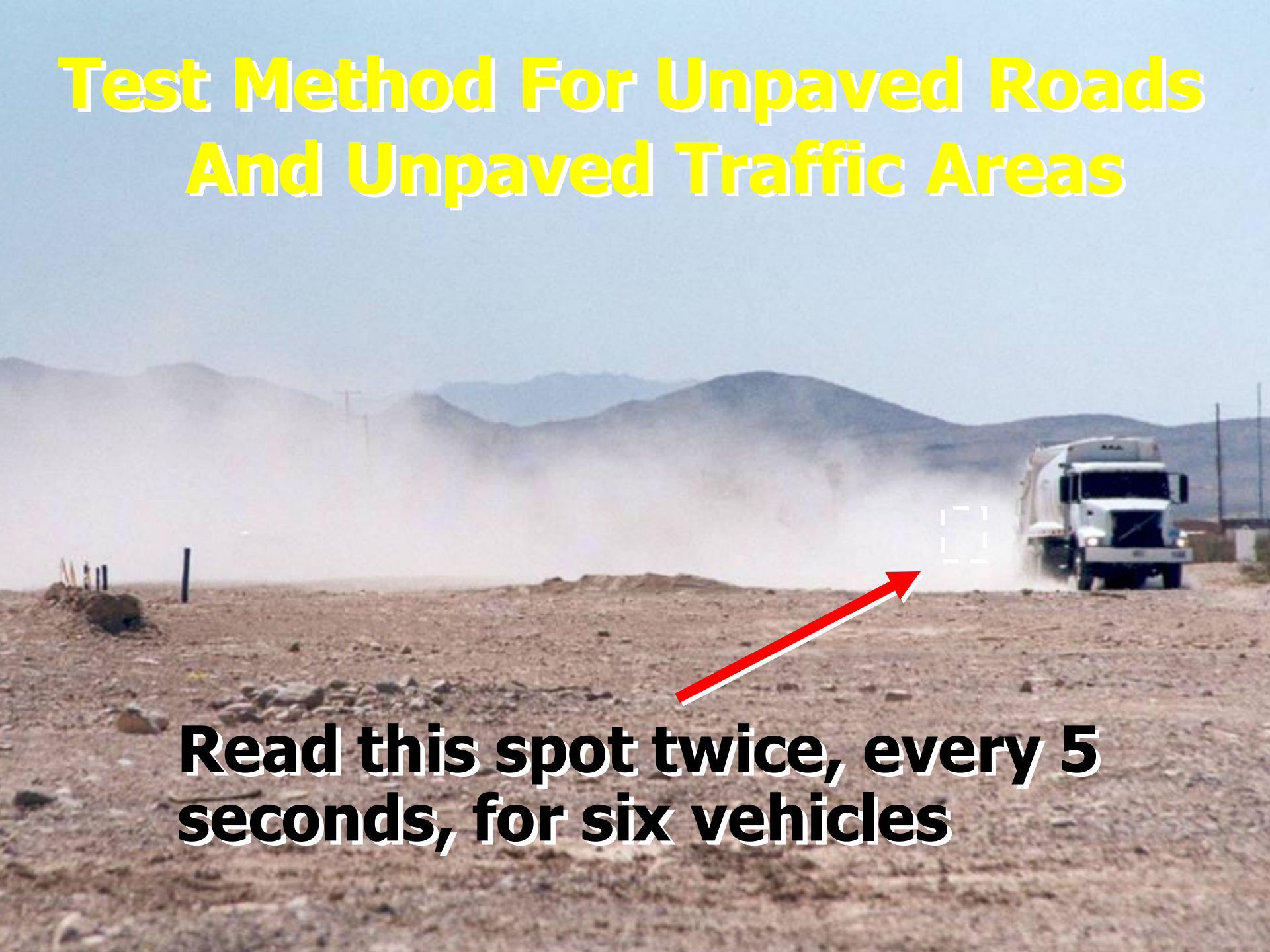
Test Method For Unpaved Roads And Unpaved Traffic Areas

- 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



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 140^0 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

- 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


LEFT
WARMER
RIGHT
WARMER
REAR
WARMER
BREW
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

- 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

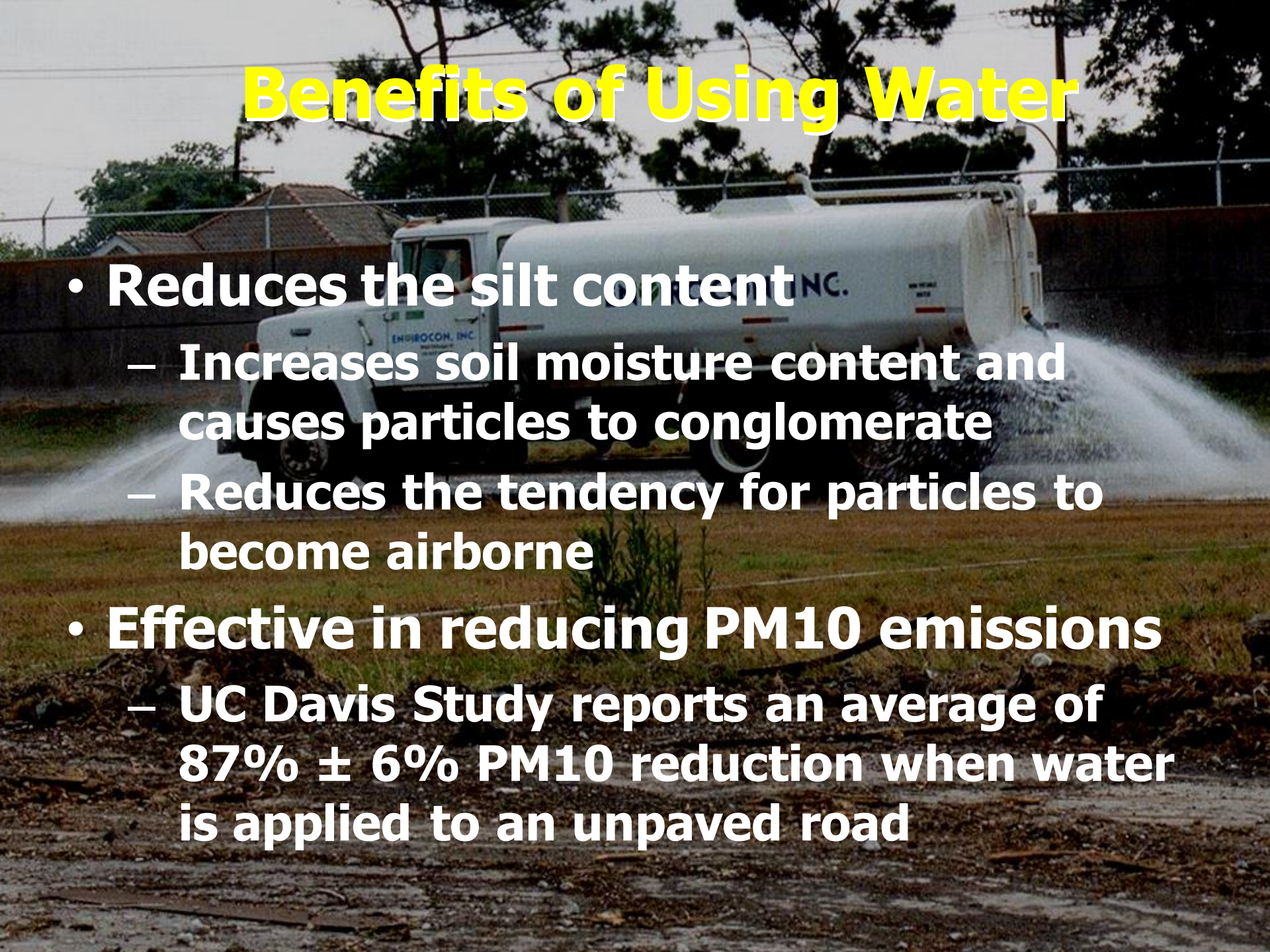
- Many available water sources
  - Fire Hydrants
  - Storage Tanks
  - Wells
  - Ponds, canals, lakes, and streams

- Easily applied and re-applied
  - Sprinklers
  - Water trucks, wagons, and trailers
  - Hoses

Foaming Products

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

Benefits of Using Water



- **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% ± 6% PM10 reduction when water is applied to an unpaved road**

Benefits of Using Water

- 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

- 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

- 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

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
RENT-A-FENCE


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?


LEF
TUR
ON


4655

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


Hertz
LAT-MOR

PM10 Sweeper?


LEFT
WARMER
RIGHT
WARMER
REAR
WARMER
BREW
BREAK TIME
CAUTION-HOT


Sydney


Oslo


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

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

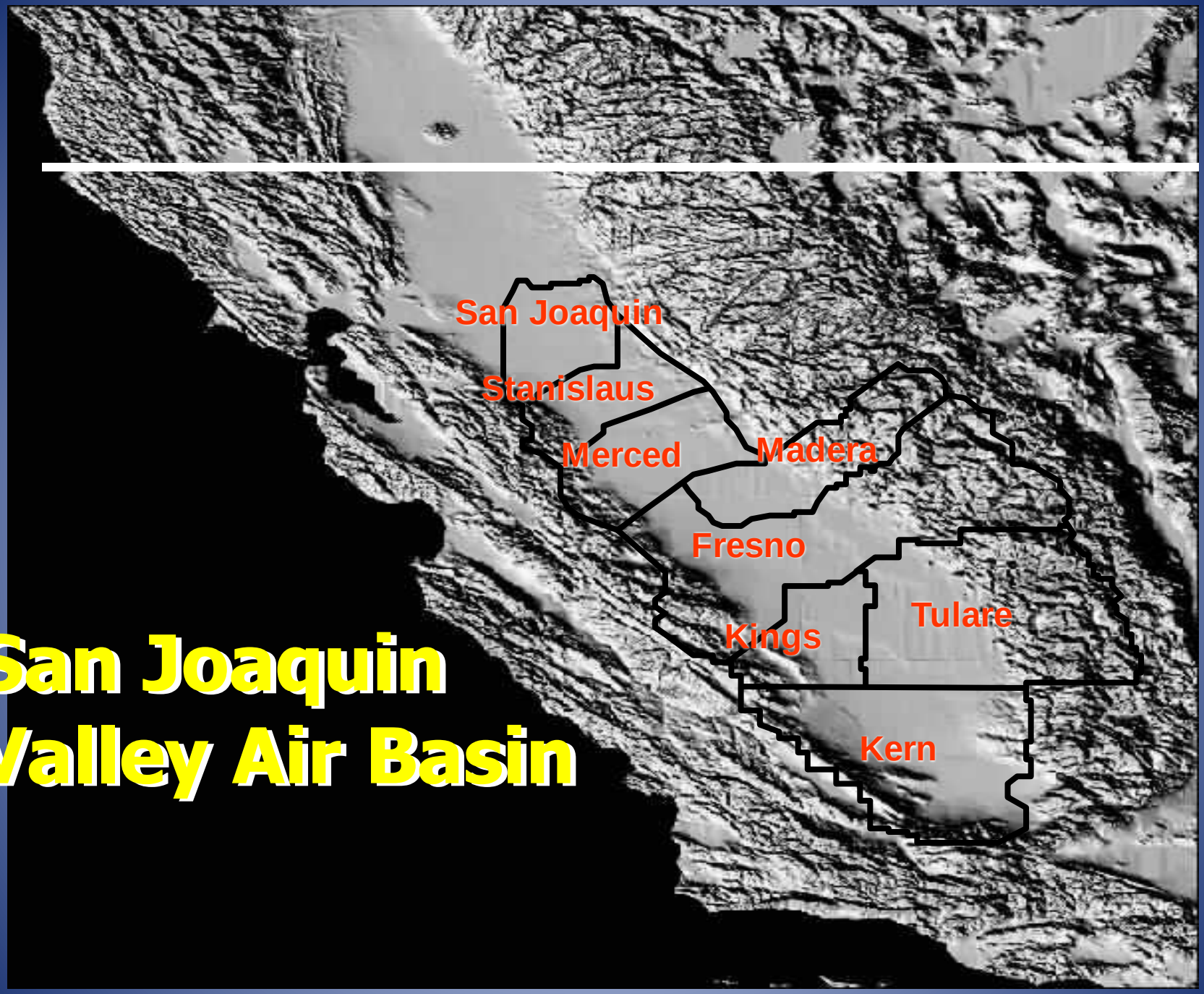
Rule 8051 OPEN AREAS

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

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 FT^2
- 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

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

Site Grading


DEERE
DEERE

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

After

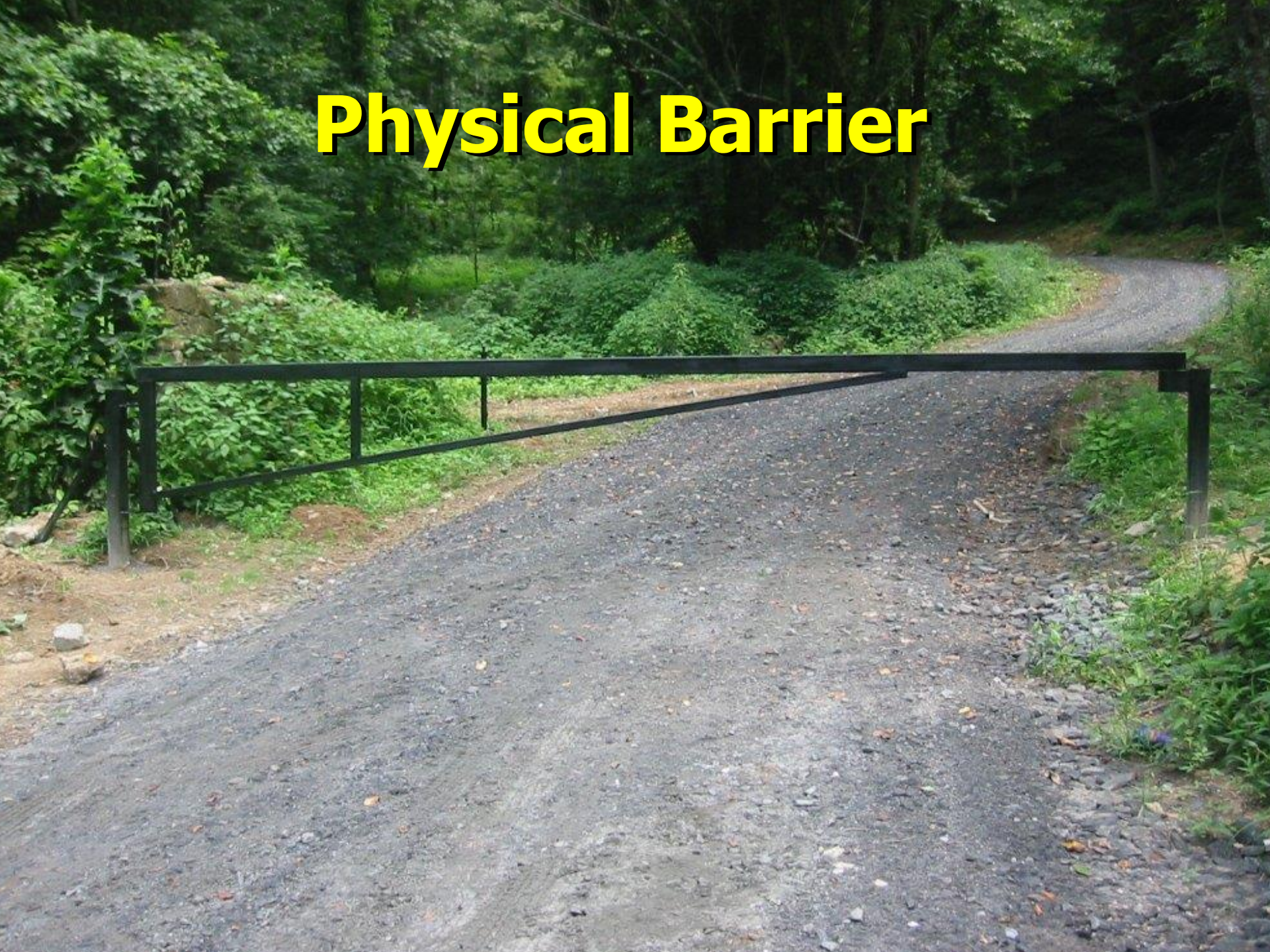
Before

Restricted Access

Posted Signs

CAUTION
DUST
AHEAD

Speed Limits


Physical Barrier


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.

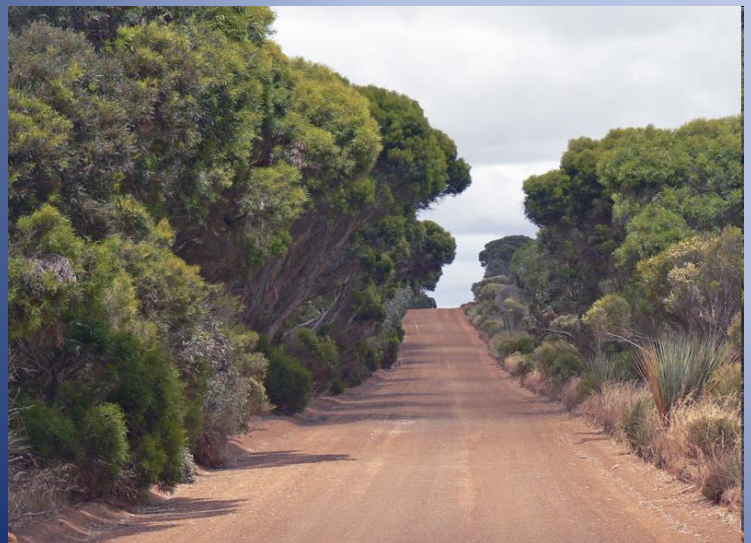
☐ Cargo compartment and load will be covered with a tarp or suitable cover before leaving the project site.

☐ **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

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.

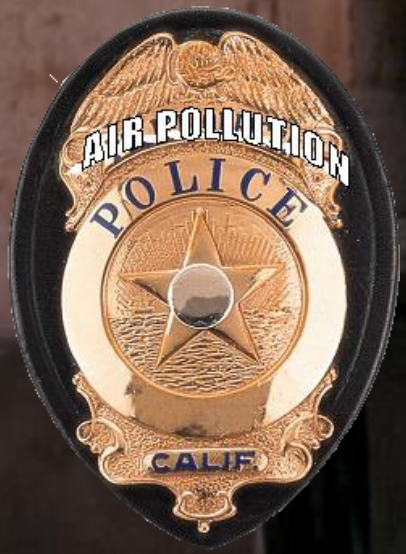
Explain and include copies: _____

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		Project Foreman
Print Name		Title
Dusty Fields		
Signature		Date
555-1212		555-1234
Phone 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/ft^2



Four Options After Being Issued An NOV

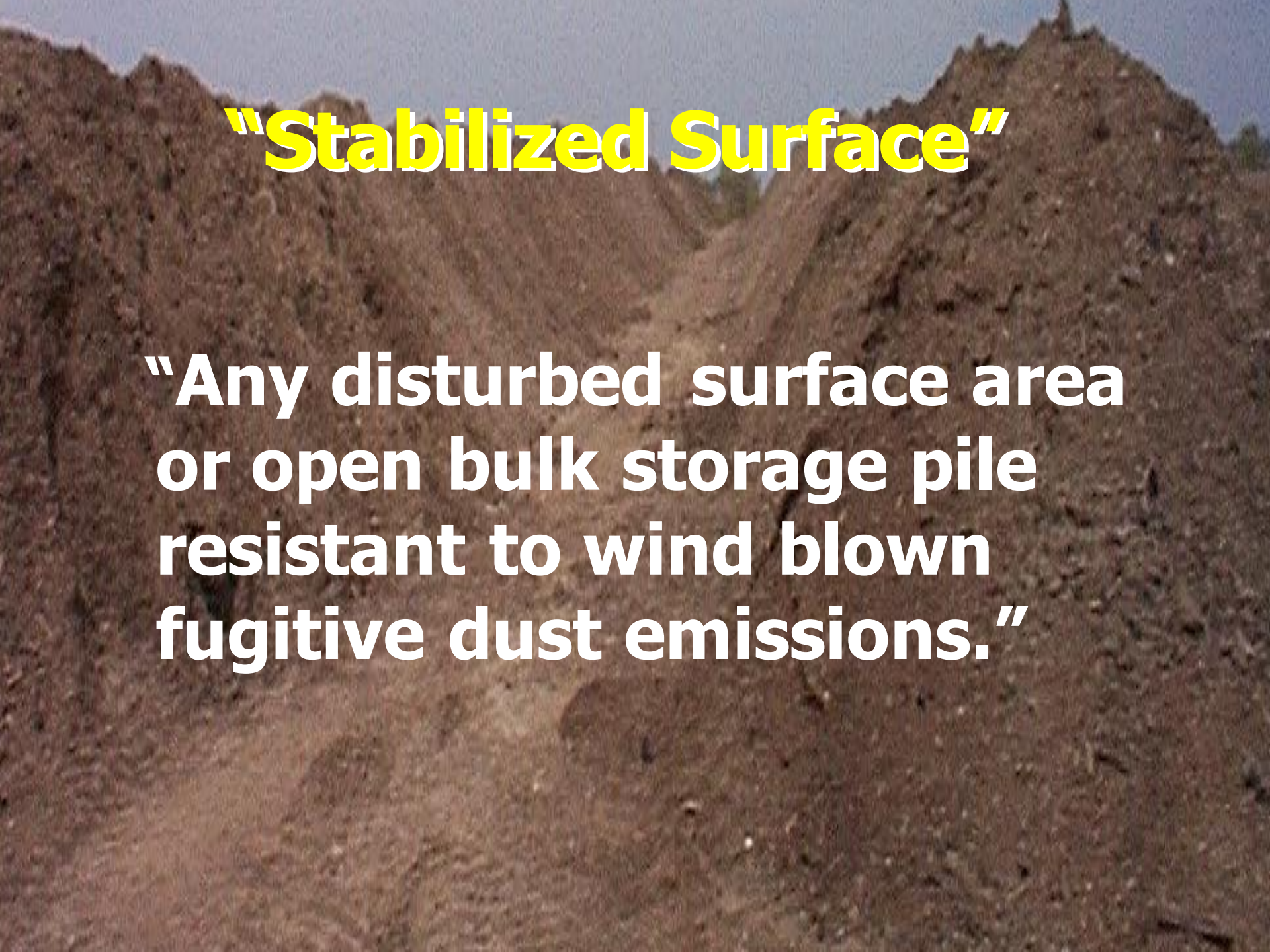
- Continue to Operate in Violation
- Cease the Non-compliant Activity
- Correct the Problem
- Apply for a Variance

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 ≥ 50%
  - Standing vegetation cover ≥ 30%
  - Combination of standing veg. & TFV
  - Non-erodible elements ≥ 10%
- Unpaved Roads-silt content ≤ 6%
- Unpaved Traffic Areas-silt content ≤ 8%



"Stabilized Surface"

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

Disturbed Surface Area

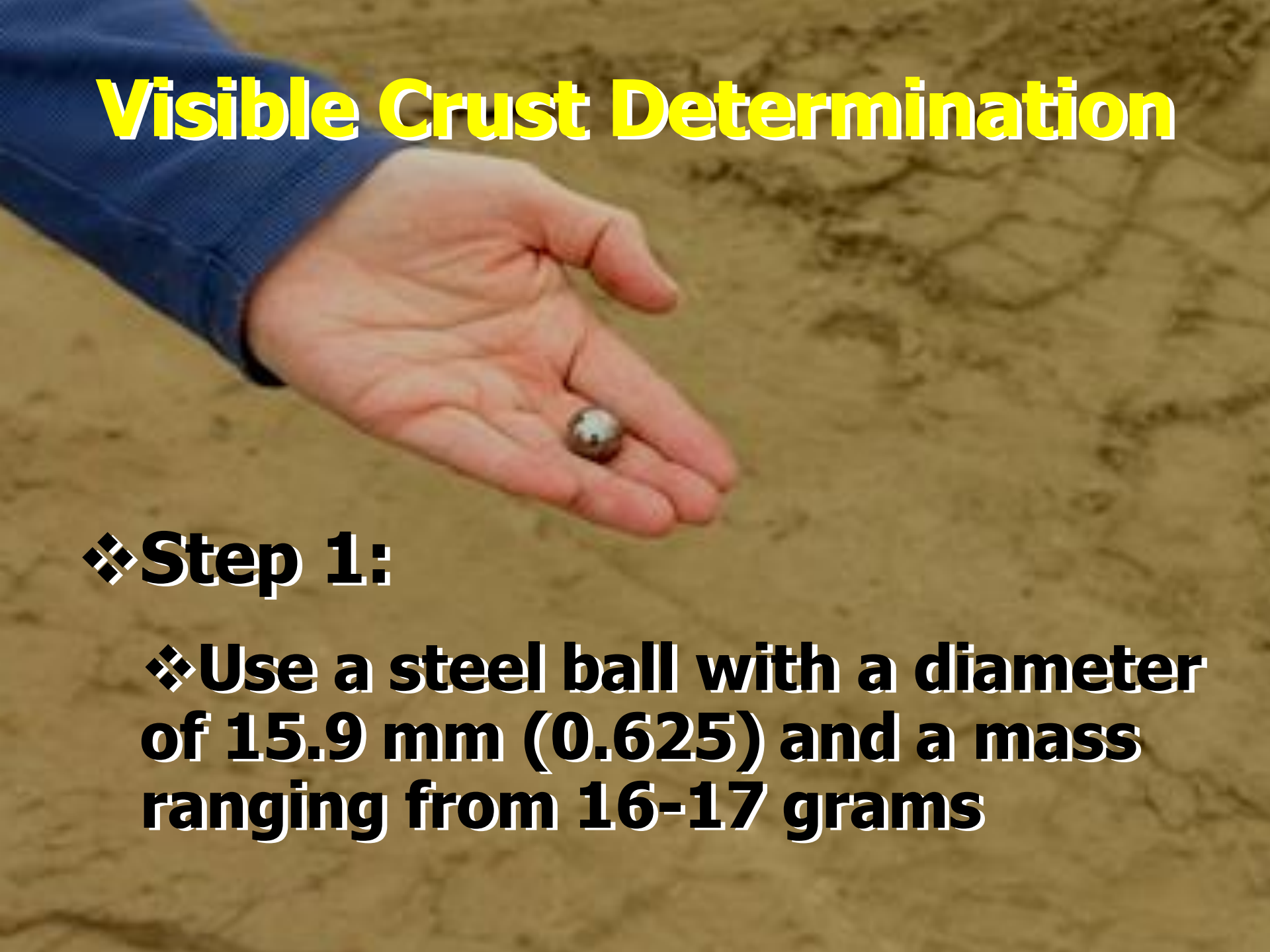
- An area in which naturally occurring materials have been physically moved, uncovered, destabilized, or otherwise modified by grading, excavating or similar activities and vehicle traffic and/or equipment operation has occurred

Visible Crust Determination

- First, determine if there <u>is</u> 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*

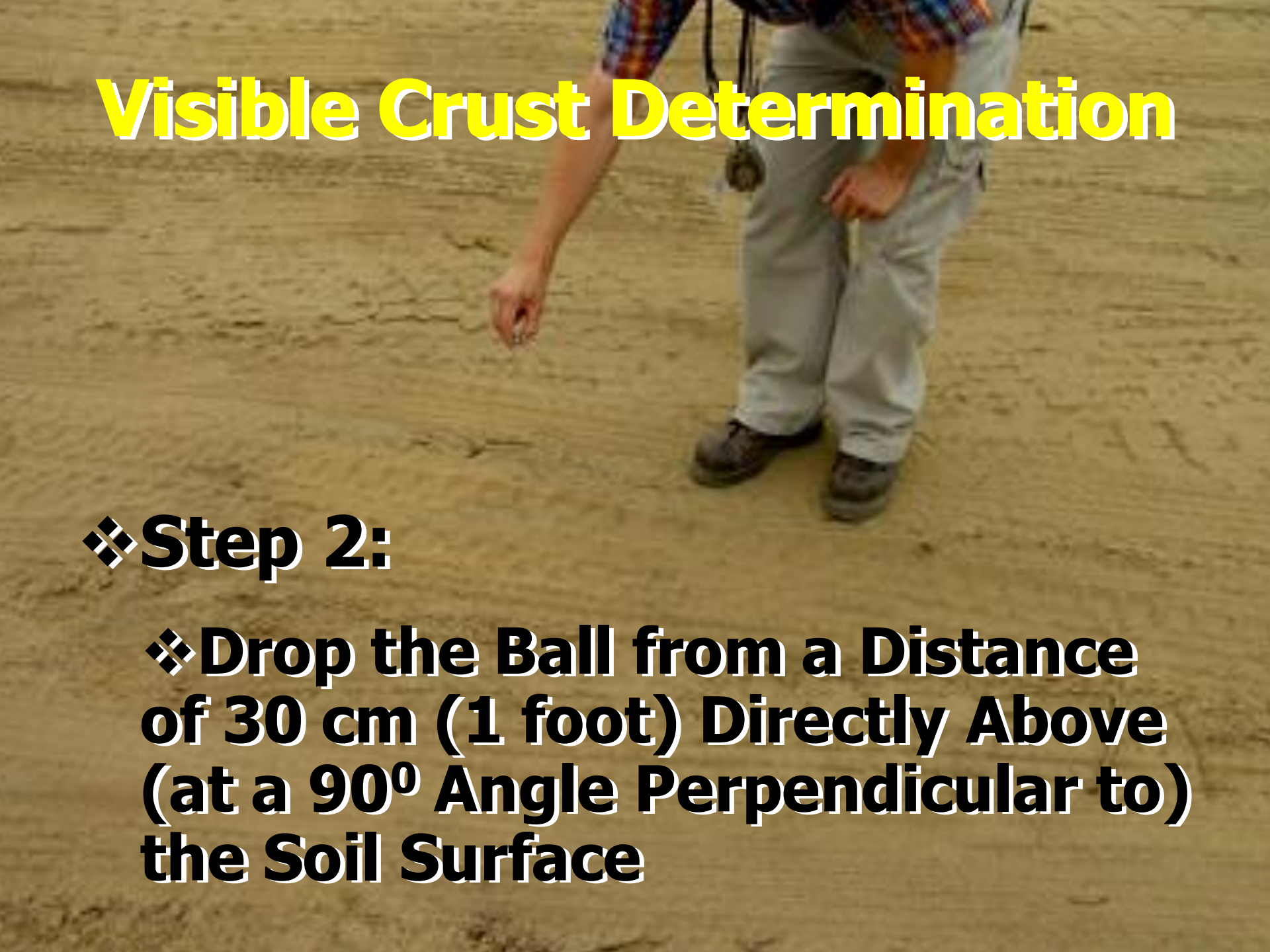
Visible Crust Determination

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 90^0 Angle Perpendicular to) the Soil Surface

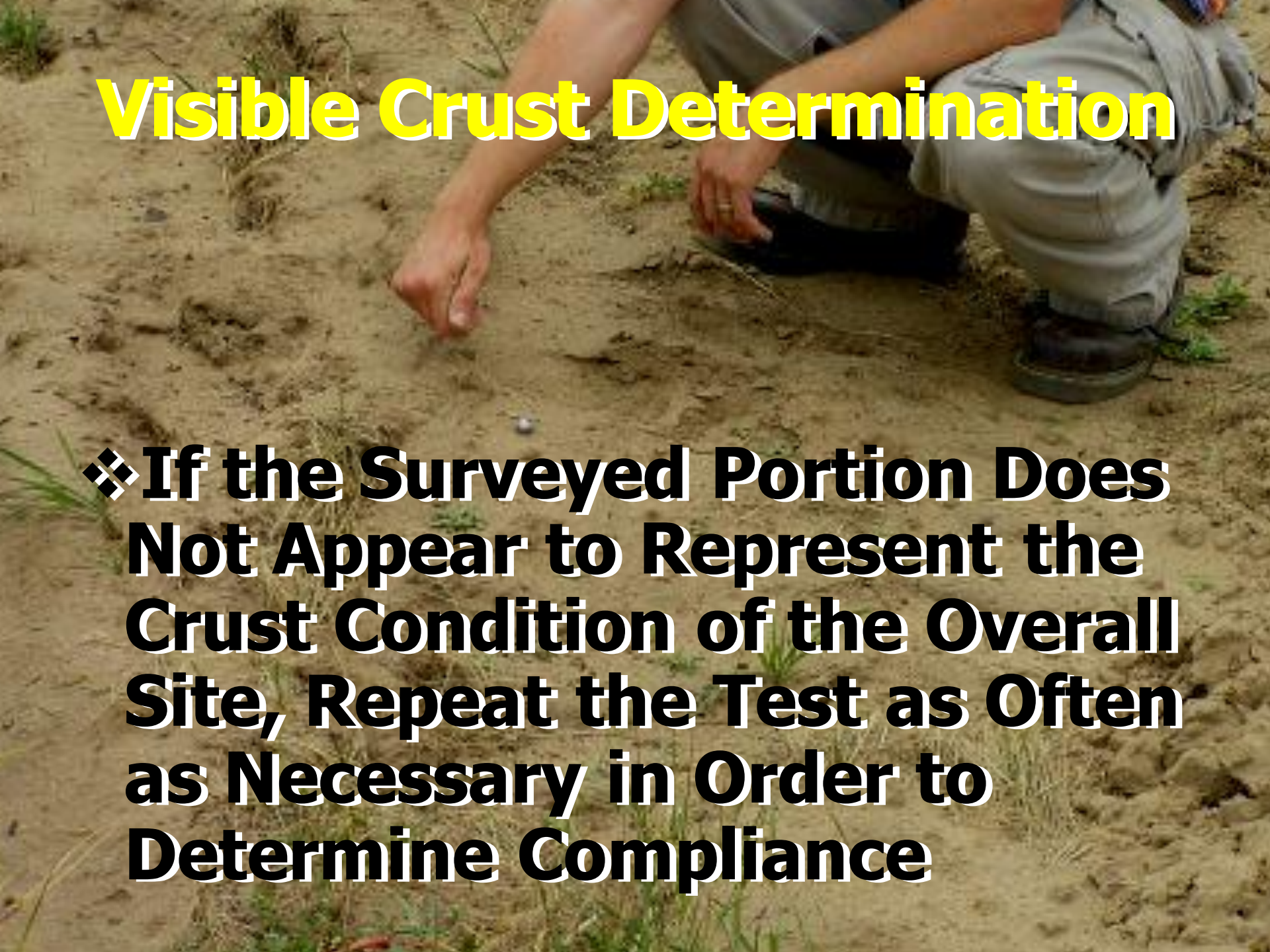
Visible Crust Determination

- 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

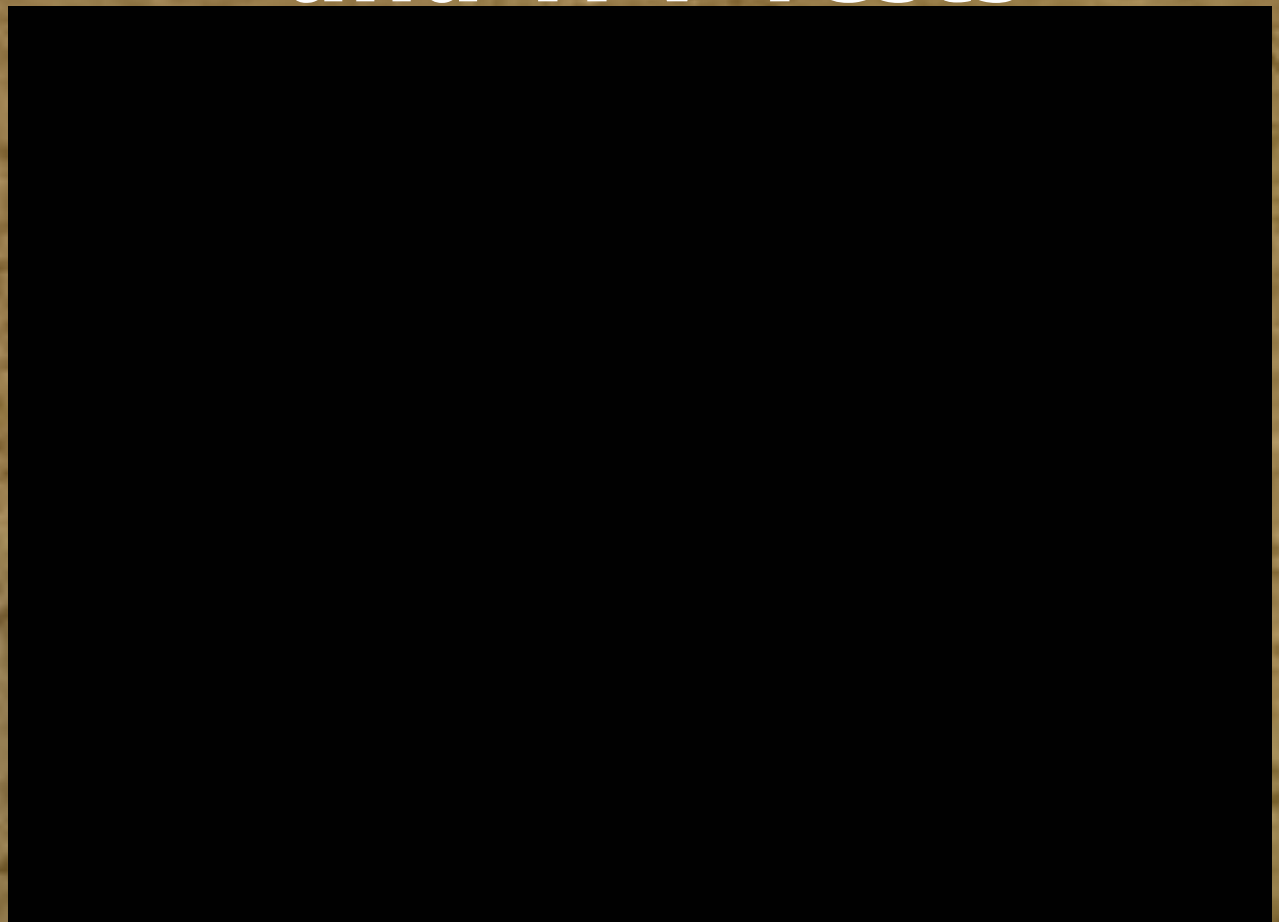
- Step 4:
  - Drop the Ball Three Times Within a Random Survey Area of 1 Square Foot of the Overall Disturbed Site. A "Visible Crust" is Present if the "Drops" Pass Two Out of Three Times

Visible Crust Determination



- 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

- **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

- **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

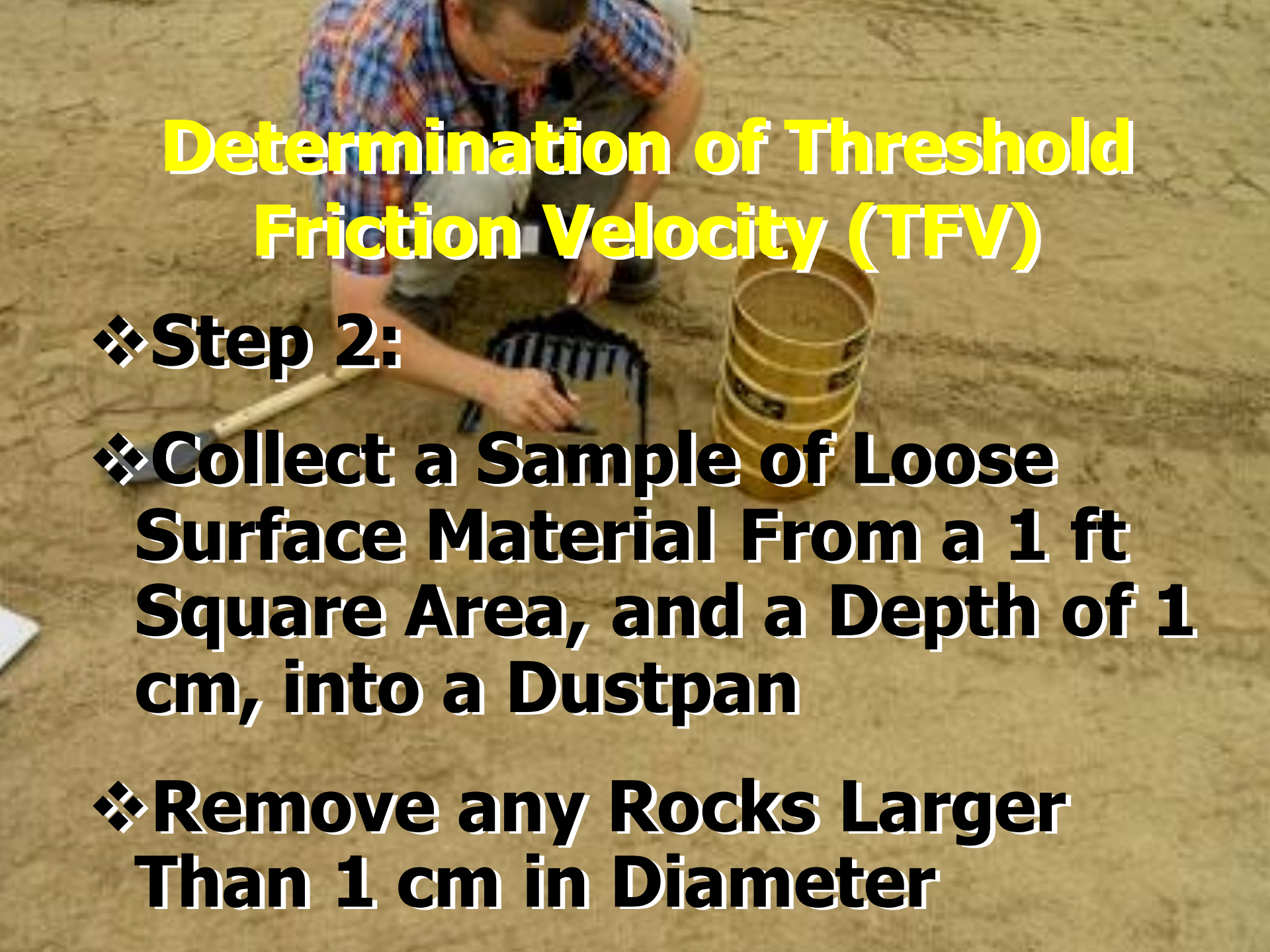
- If Source is an Unpaved Road and the Avg. "PSC" is 6% or Less, the Surface is **STABLE**
- If Unpaved Parking Lot and the Avg. "PSC" is 8% or Less, the Surface is **STABLE**

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

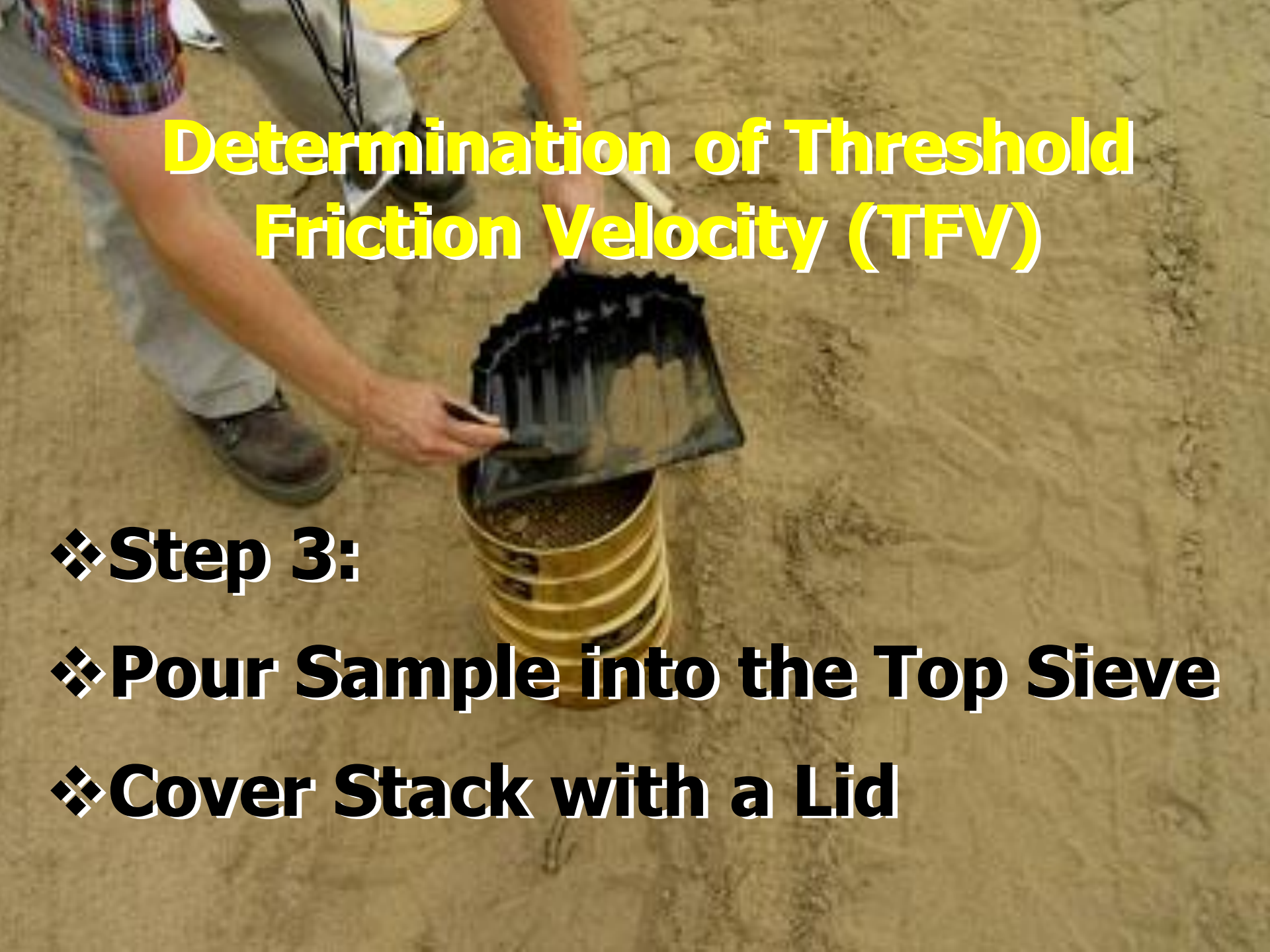
Determination of Threshold Friction Velocity (TFV)

- 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



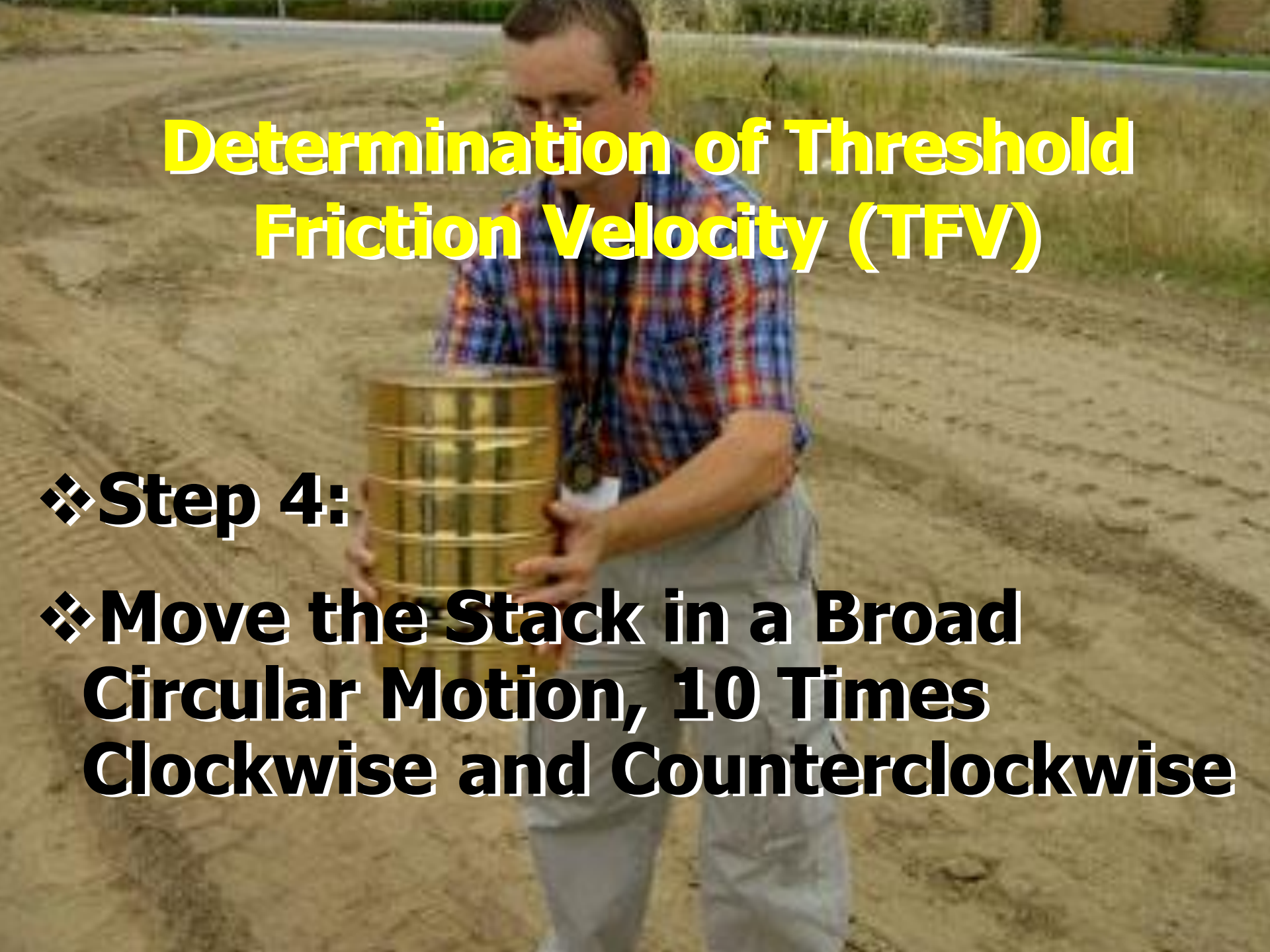
Determination of Threshold Friction Velocity (TFV)

- 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)

- Step 3:
- Pour Sample into the Top Sieve
- Cover Stack with a Lid



Determination of Threshold Friction Velocity (TFV)

- 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

- 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)

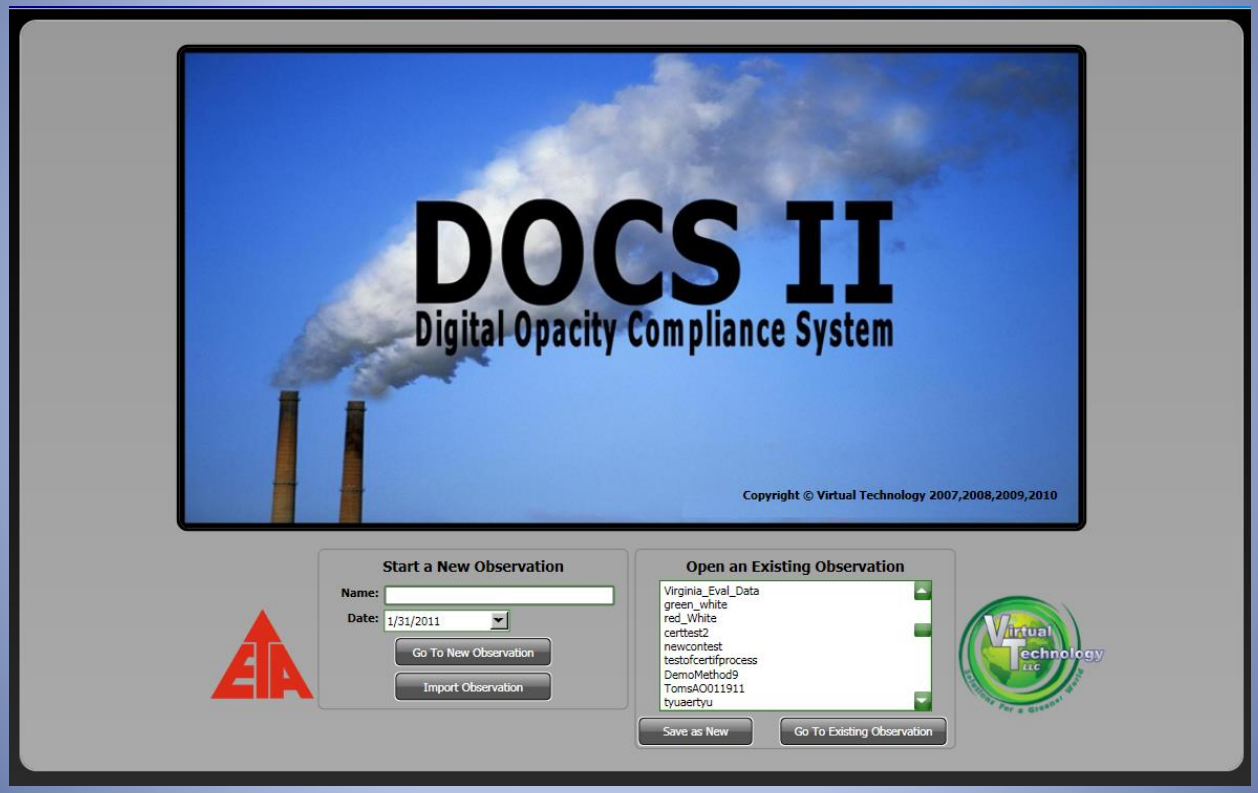
- If the Average Rock Cover is > or = to 10%, the Surface is "Stable"
- If < 10%, Use Table 2 of the Determination of Threshold Velocity Method (TFV) to Calculate the Correction Factor to the TFV

Digital Opacity Compliance System

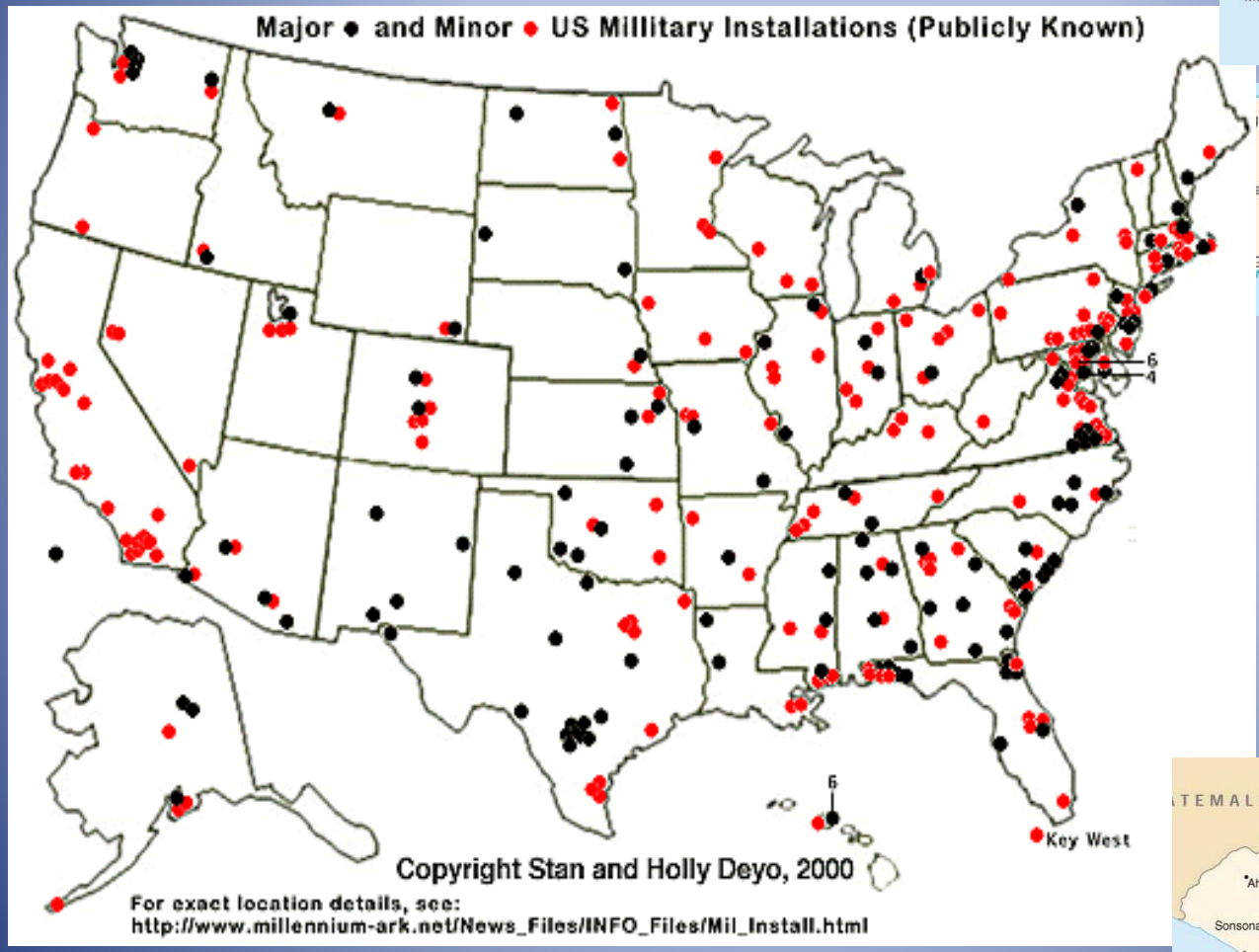
Second Generation

EPA Alternative Method 082, Moving Opacity Technology

Forward the 301 Study for Large Stacks

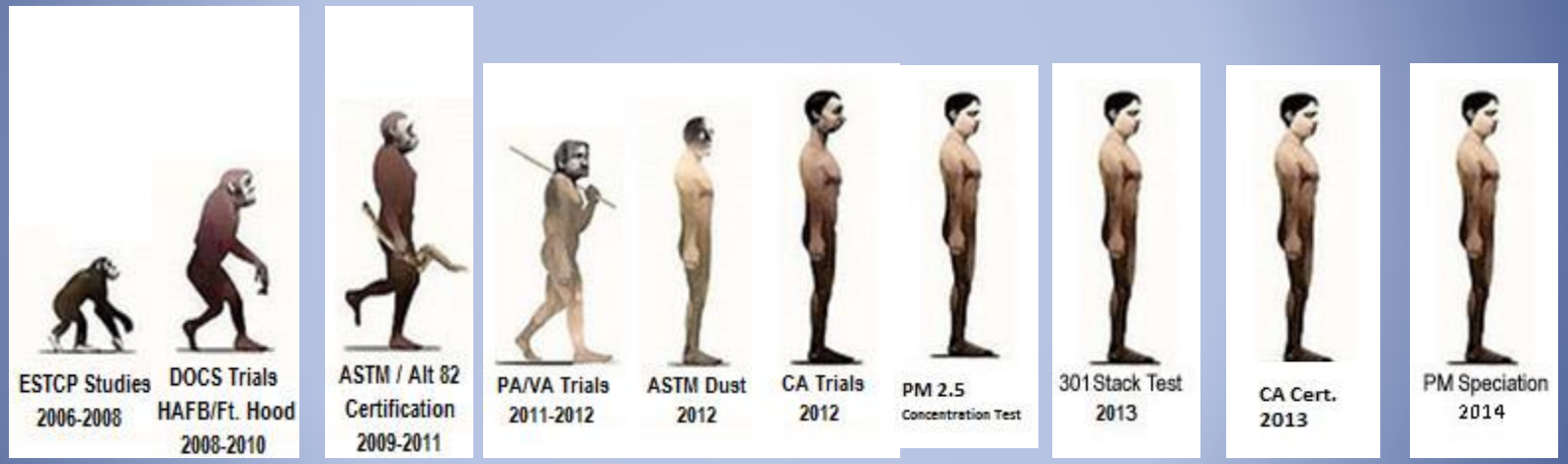


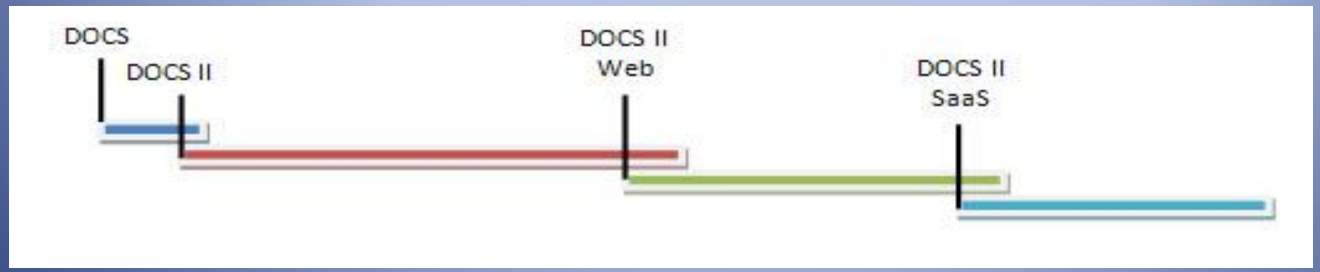
Use of DOCS II



❖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 Transmisometer (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
  - ±7.5% overall and <= 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, ±7.5% overall and <= 15% within each set of 25
- Cert. duration 3 ½ 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

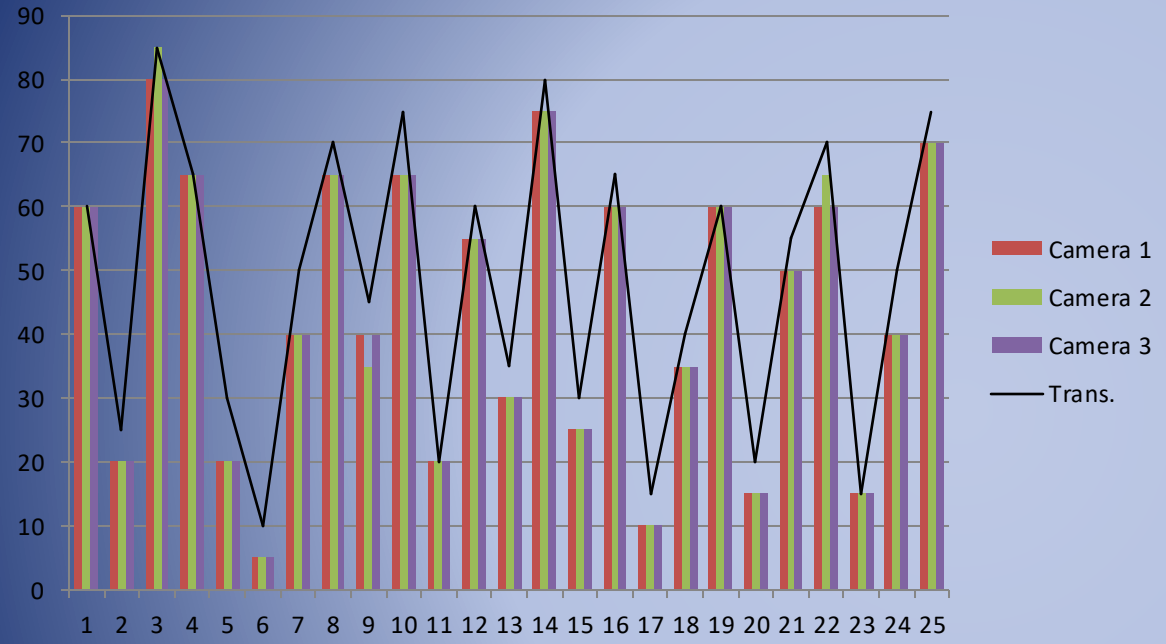
- D7520-12 Updated Approved by D22-03 In October 2012
  - Allows used of any Digital Image Device
    - High Definition Digital Recorders (Digital Video)
    - LTE based Cameras (Cell Phones)
    - CCD based Cameras (98% of Digital Cameras)
  - Matches ASTM Certification requirements to EPA ALT 082
  - 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

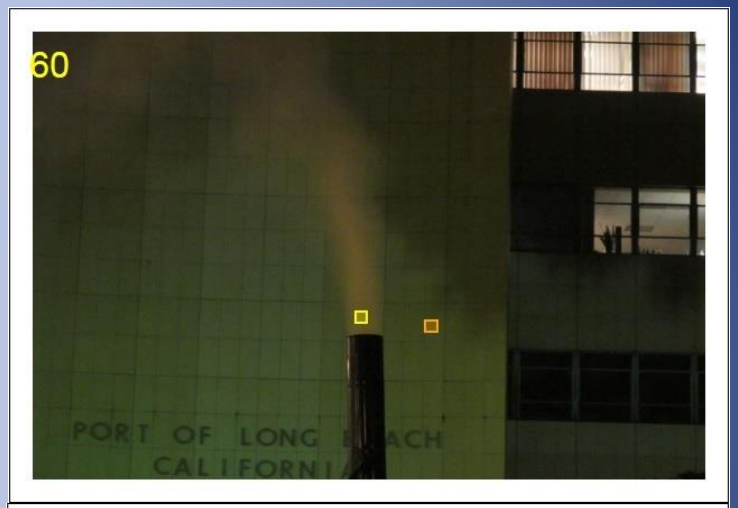
301 Study Summary

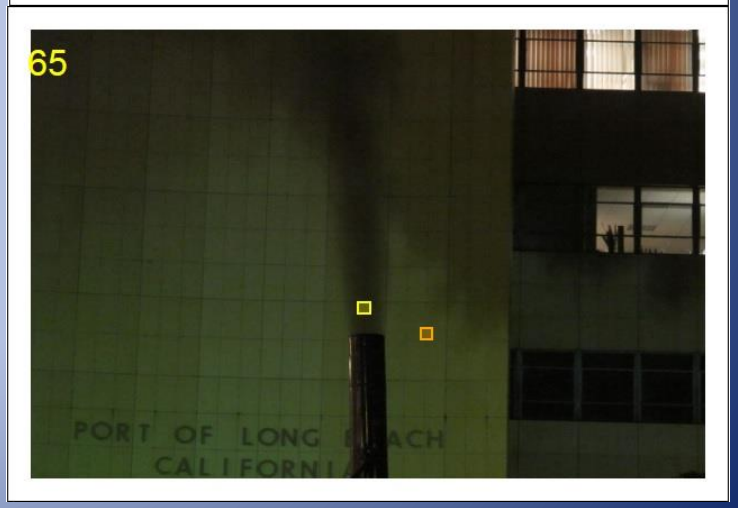
- ALT 082 is the same as Method 9
  - Stacks Greater than 7’ at the exit
  - Deviation between Methods is < 5% overall
  - Deviation individually < 10%
  - Method 9 tolerance is 15%
  - ALT 082 has less variability that Method 9
  - ALT 082 is more repeatable than Method 9

DOCS II CARB Night Smoke School

Long Beach, CA, July 2013







Fugitive Dust Study

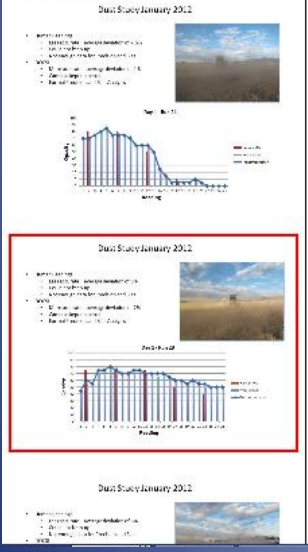
Long Path Transmisometer, vs DOCS II and Human

[X] Close Window

DOCS II Presentations

ASTM Dust

Select a Slide:



Dust Study January 2012

- 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

Slide Related Images

PM Speciation

The Future of DOCS III

DOCS II Presentations

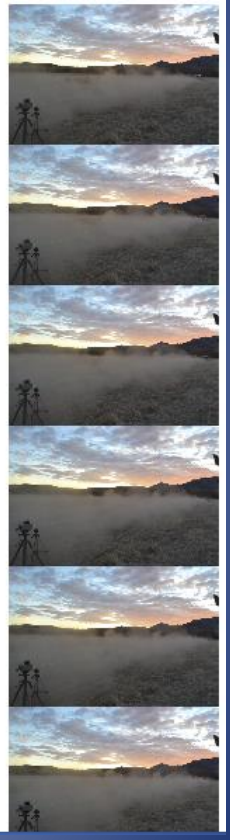
Future

Select a Slide:

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…

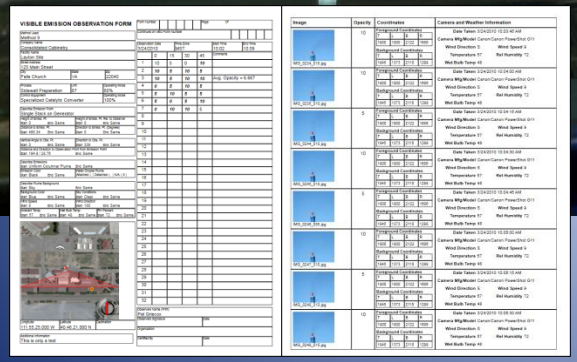
Slide Related Images



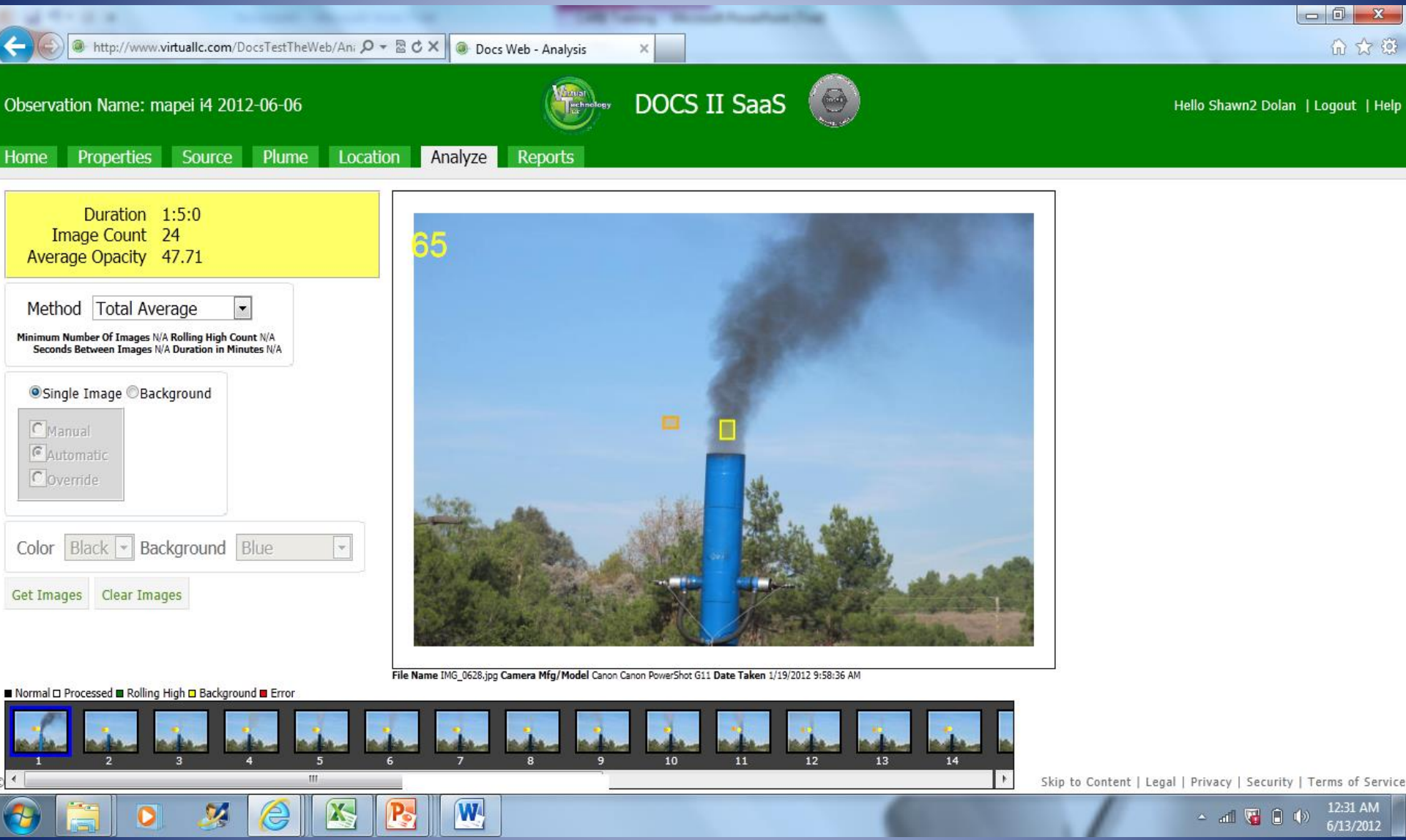
Adding Lasers of multiple wave lengths to the imagery,
allows scatter measurements to determine PM size and concentration.

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



Analysis


http://www.virtuallc.com/DocsTestTheWeb/Ani
Docs Web - Analysis
Observation Name: mapei i4 2012-06-06
DOCS II SaaS
Hello Shawn2 Dolan | Logout | Help
Home
Properties
Source
Plume
Location
Analyze
Reports
Duration 1:5:0
Image Count 24
Average Opacity 47.71
Method Total Average
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 Black Background Blue
Get Images
Clear Images
65
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
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Skip to Content | Legal | Privacy | Security | Terms of Service
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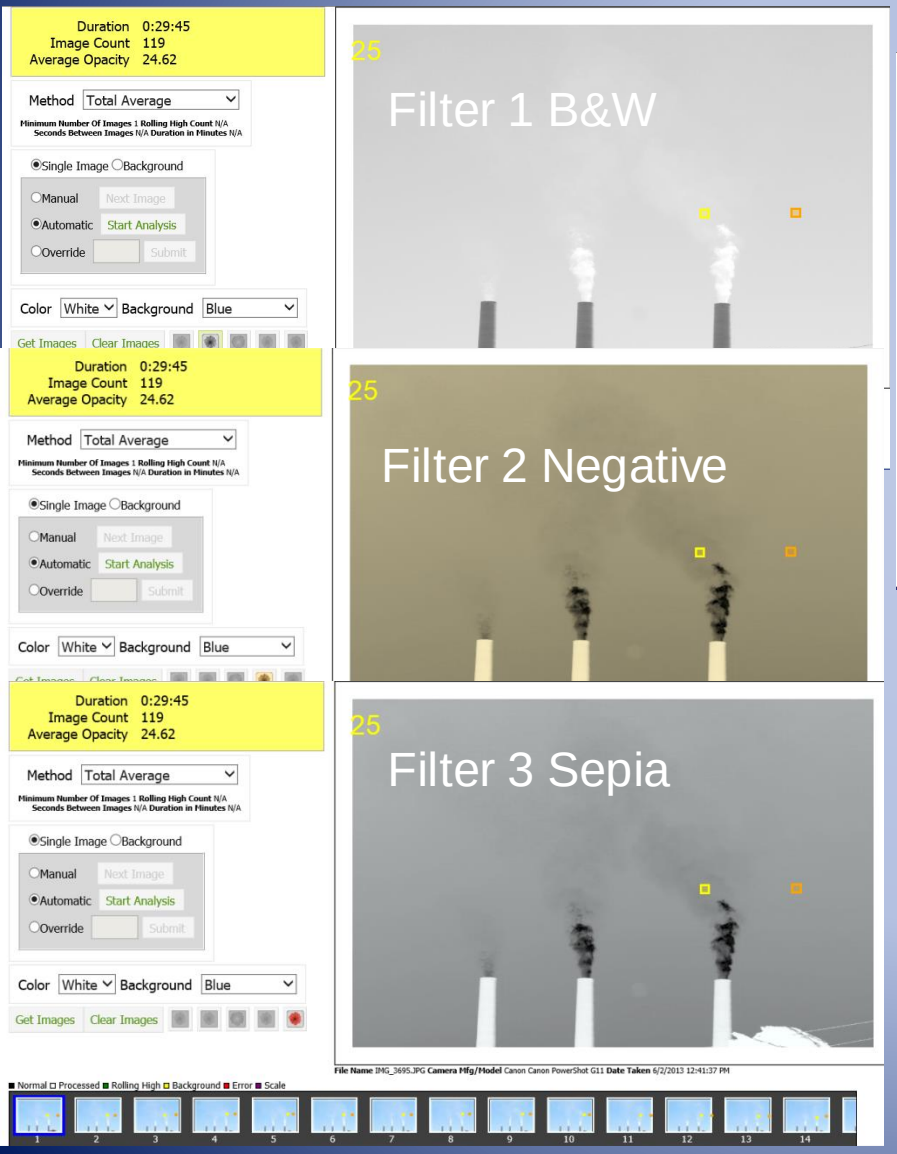
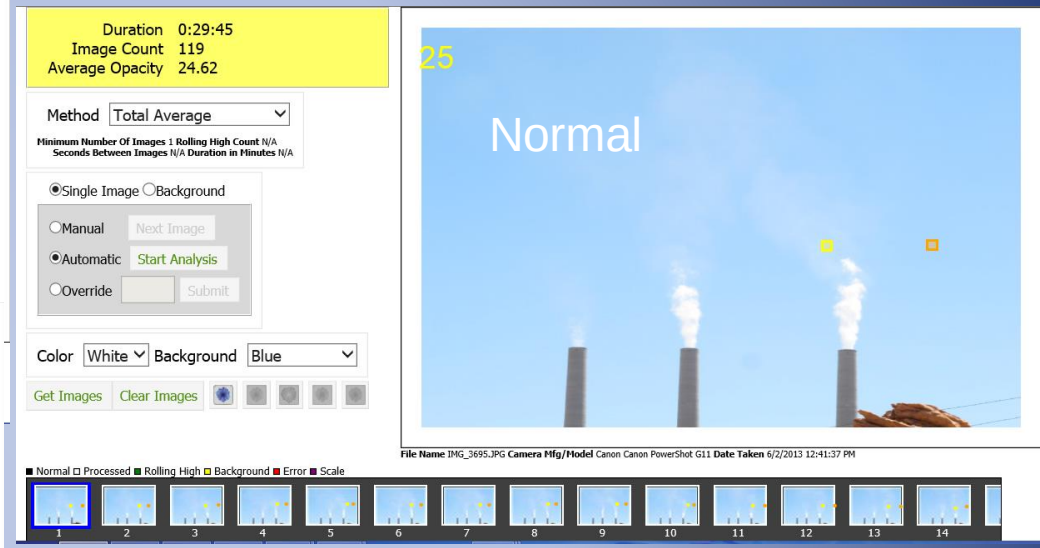
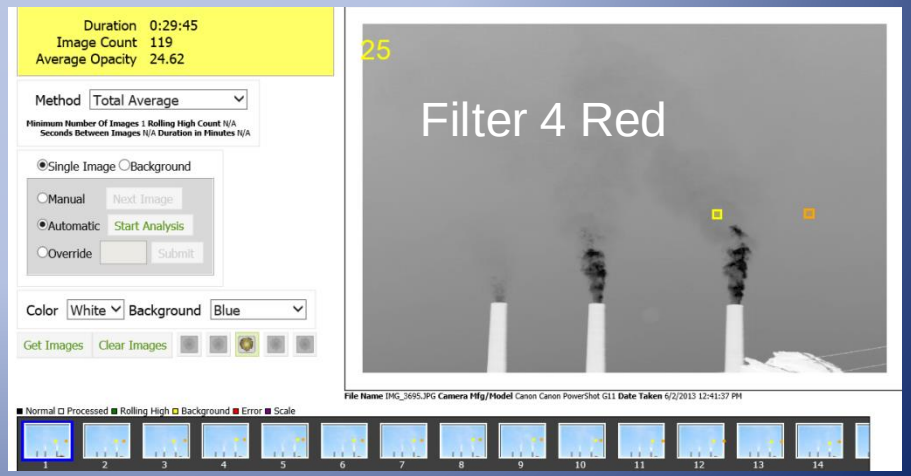
6/13/2012

Enhanced Visibility with Filters

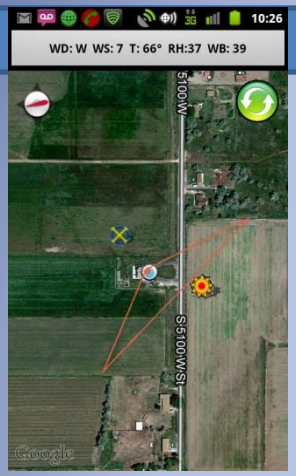


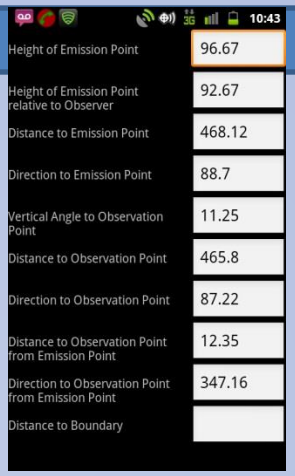


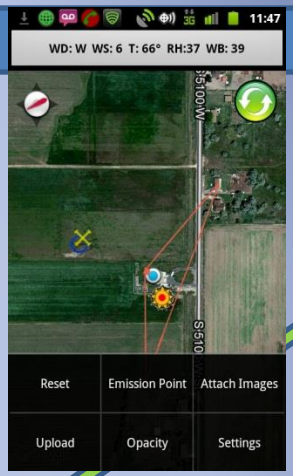


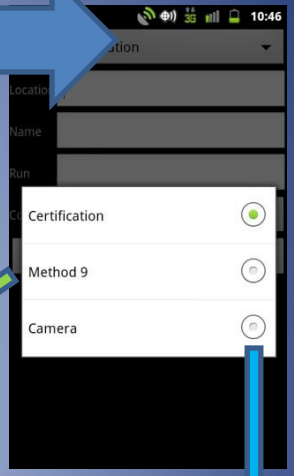
DOCS II SaaS Data Collection
" Method 9" in the Google Play Store

Document a Method 9 VEE on your Handheld





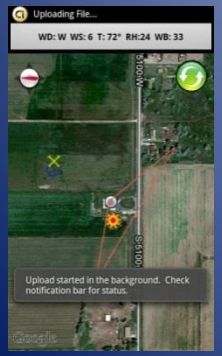


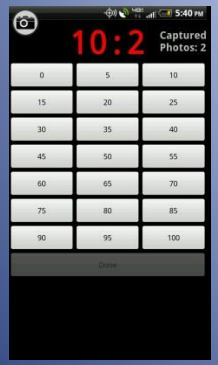


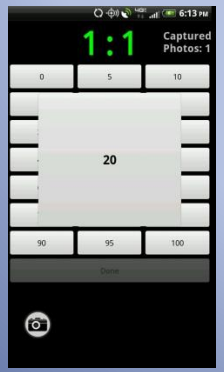
Method 9

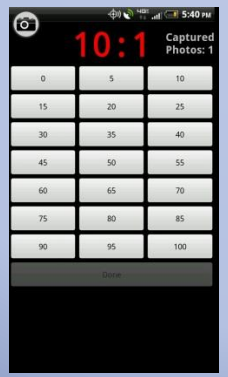
Alt. Method 082

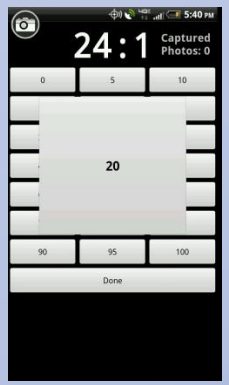
Display Timer & Count



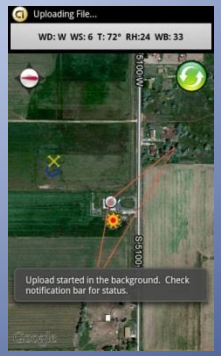








Auto Timer & Count



Report

VISIBLE EMISSION OBSERVATION FORM

Form Number | Page | Of

Continued on VEO Form Number

Method Used	Company Name	Facility Name	Street Address	City	State	Zip
Method 9	Consolidated Cabinetry	Layton Site	125 Main Street	Falls Church	VA	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.	Height of Emiss. Pt. Rel. to Observer
Start 0 End Same	Start 0 End Same
Distance to Emiss. Pt.	**Direction to Emiss. Pt. (Degrees)**
Start 405.34 End Same	Start 0 End Same
Vertical Angle to Obs. Pt.	**Direction to Obs. Pt.**
Start 0 End Same	Start 339 End Same

Distance and Direction to Observation Point from Emission Point: Start 184.8 / 28.76 End Same

Describe Emissions: Start Uniform Columnar Plume End Same

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

Describe Plume Background: Start Sky End Same

Background Color	Sky Conditions
Start Blue End Same	Start Clear End Same
Wind Speed	**Wind Direction**
Start 9 End Same	Start 180 End Same

Ambient Temp.	Wet Bulb Temp.	RH Percent
Start 57 End Same	Start 48 End Same	Start 72 End Same

Longitude	Latitude	Declination
111.55.25.000 W	40.46.21.000 N	

Additional Information: This is only a test

Observation Date	Time Zone	Start Time	End Time
3/24/2010	MST	10:02	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					
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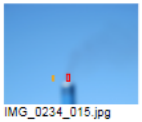
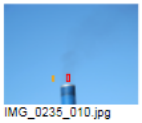
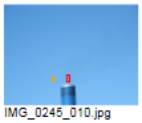
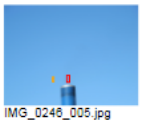
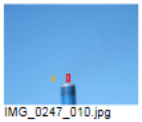
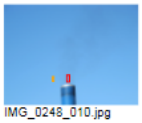
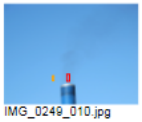
26					
27					
28					
29					
30					
31					
32					

Observers Name (Print): Pat Griecox

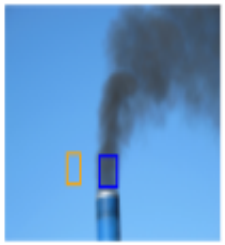
Observers Signature | Date

Organization

Certified By | Date

Image	Opacity	Coordinates	Camera and Weather Information
 IMG_0234_015.jpg	10	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0235_010.jpg	10	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0244_010.jpg	5	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0245_010.jpg	10	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0246_005.jpg	5	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0247_010.jpg	10	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0248_010.jpg	5	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0249_010.jpg	10	Foreground Coordinates: T 1900, L 1800, B 2122, R 1686 Background Coordinates: T 1945, L 1373, B 2110, R 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
 IMG_0222.JPG	55	Foreground Coordinates T: 1761, L: 1862, B: 2128, R: 1606 Background Coordinates T: 1788, L: 1280, B: 2183, R: 996	Date Taken 3/24/2010 10:00:40 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction SW Wind Speed 10 Temperature 60 Rel Humidity 38 Wet Bulb Temp 34
 IMG_0223.JPG	75	Foreground Coordinates T: 1783, L: 1911, B: 2139, R: 1595 Background Coordinates T: 1714, L: 1181, B: 2018, R: 994	Date Taken 3/24/2010 10:00:57 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction SW Wind Speed 10 Temperature 60 Rel Humidity 38 Wet Bulb Temp 34
 IMG_0224.JPG	85	Foreground Coordinates T: 1732, L: 1917, B: 2124, R: 1583 Background Coordinates T: 1703, L: 1291, B: 2093, R: 1033	Date Taken 3/24/2010 10:01:20 AM Camera Mfg/Model Canon/Canon PowerShot G11 Wind Direction SW Wind Speed 10 Temperature 60 Rel Humidity 38 Wet Bulb Temp 34

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%

❖www.virtuallc.com

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

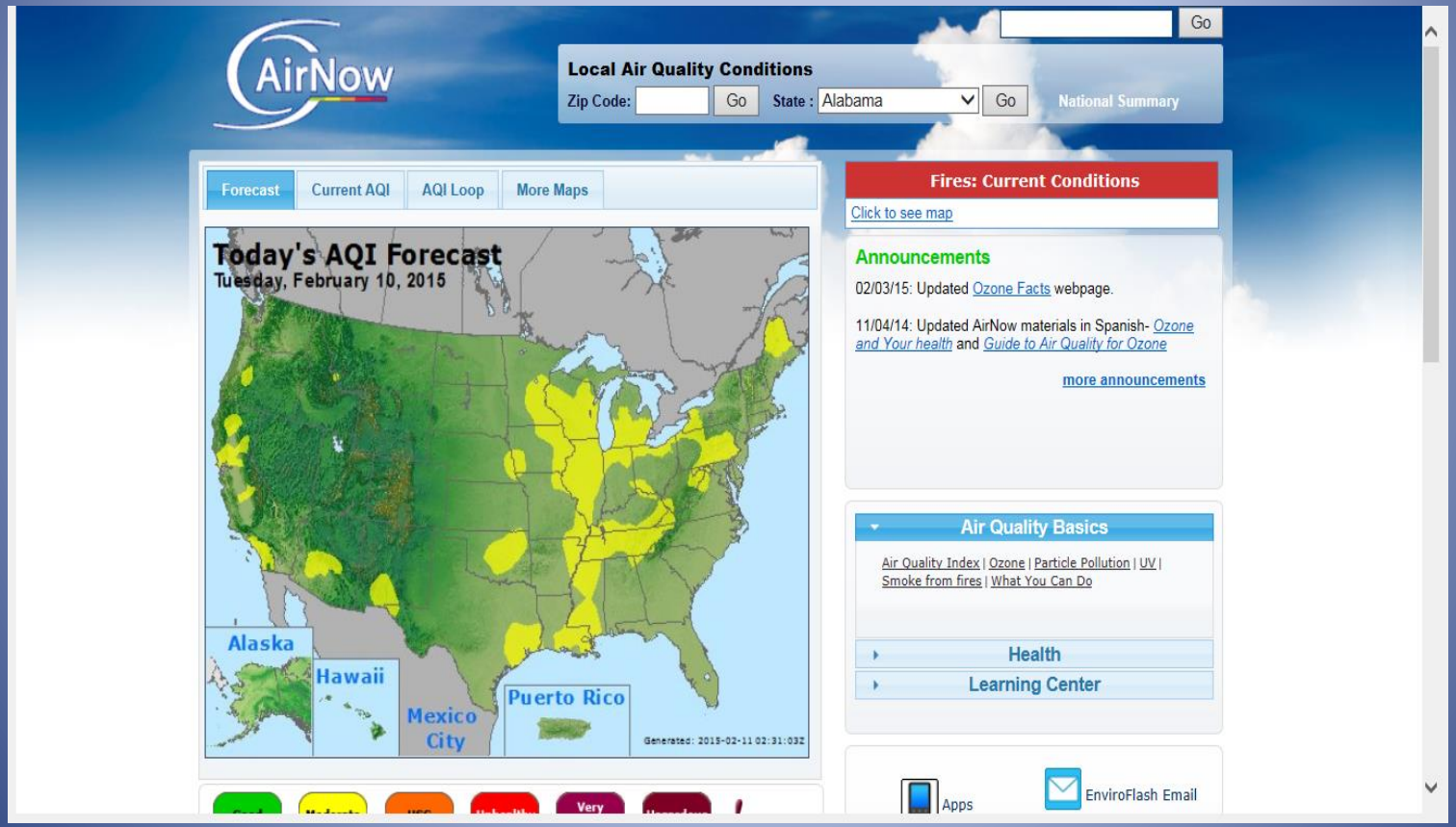

AIRNOW
A New Way to Look at the Atmosphere
Template Presentation for Regional Toolkit

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/



AirNow

Go

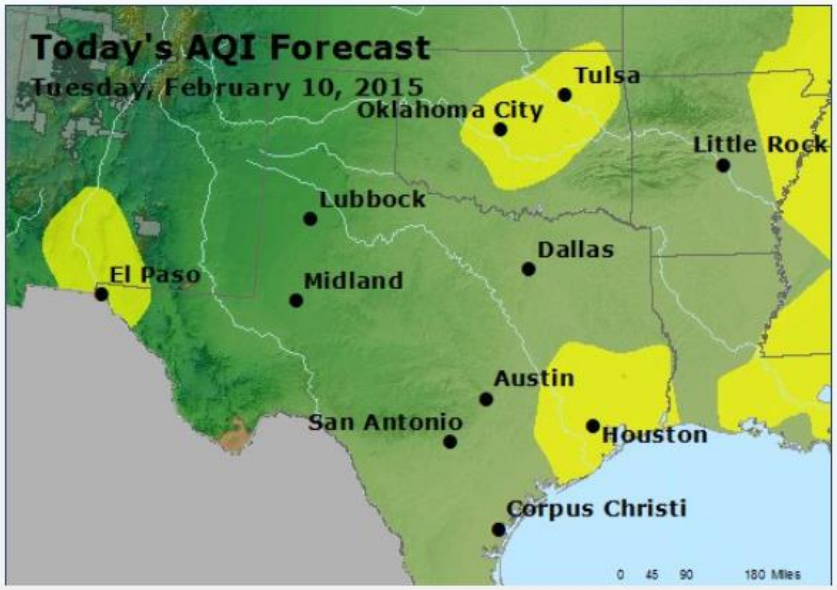
Local Air Quality Conditions

Zip Code: Go State : Oklahoma 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

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
City's ozone level hits U.S. high
Smog conditions worst in 15 years; Ohio EPA planning tougher standards

Weather
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

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

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. **...**

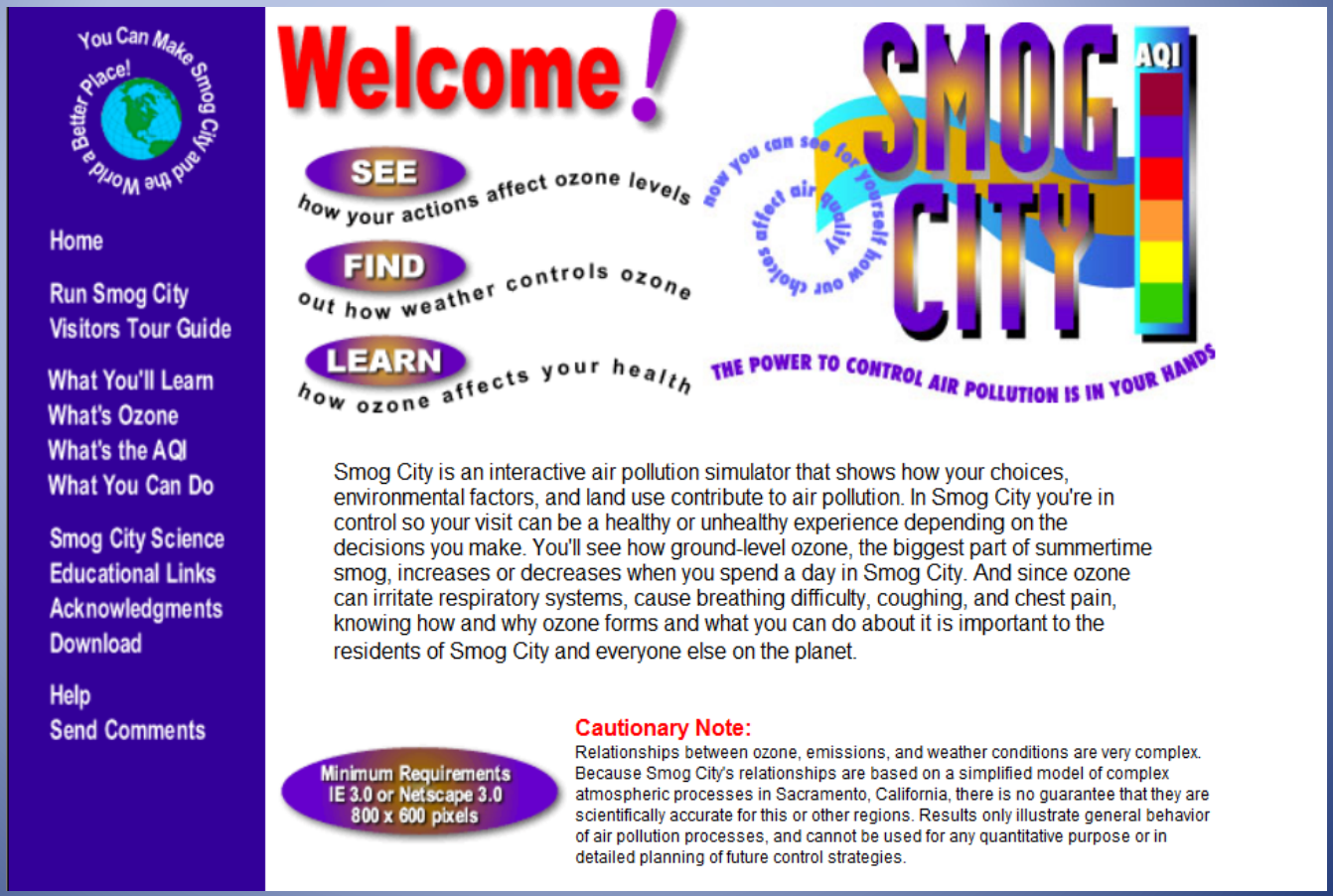
How is Pet Coke Regulated?

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**

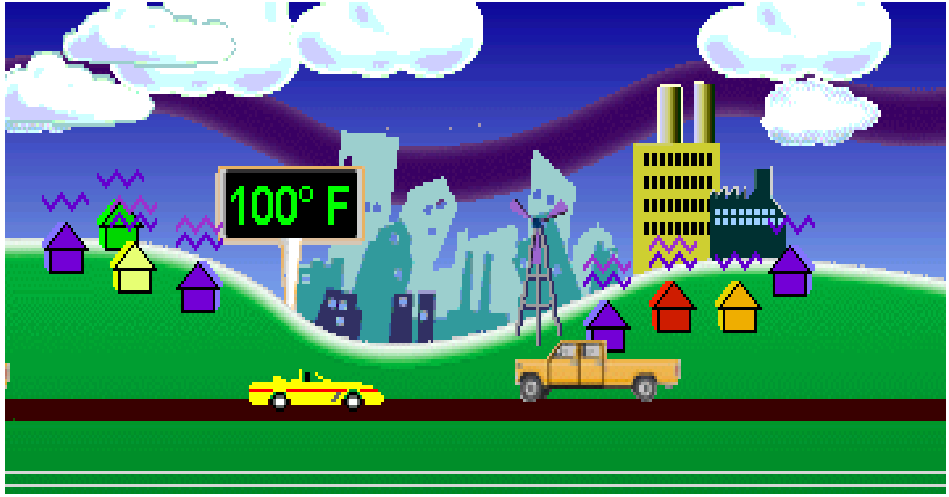


You Can Make Smog City and the World a Better Place!

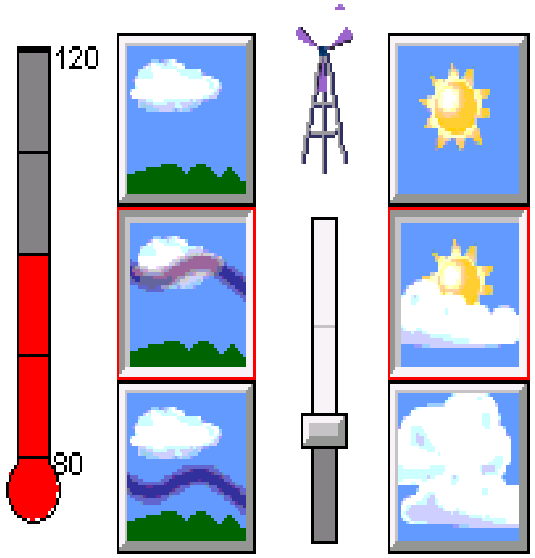
- Home
- Run Smog City
- Visitors Tour Guide
- What You'll Learn
- What's Ozone
- What's the AQI
- What You Can Do
- Smog City Science
- Educational Links
- Acknowledgments
- Download
- Help
- Send Comments

SMOG CITY

HELP



Select Weather Conditions

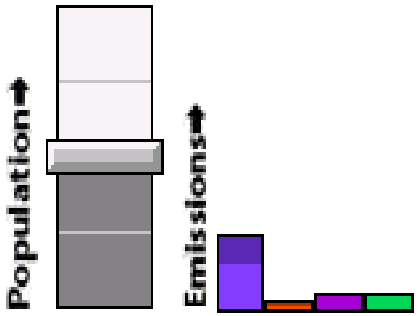


OZONE LEVELS

HEALTH EFFECTS AT PEAK OZONE LEVEL

Good

Select Population Level



Select Emissions Levels

Cars and Trucks

Off Road

Industry

Consumer Products

Start

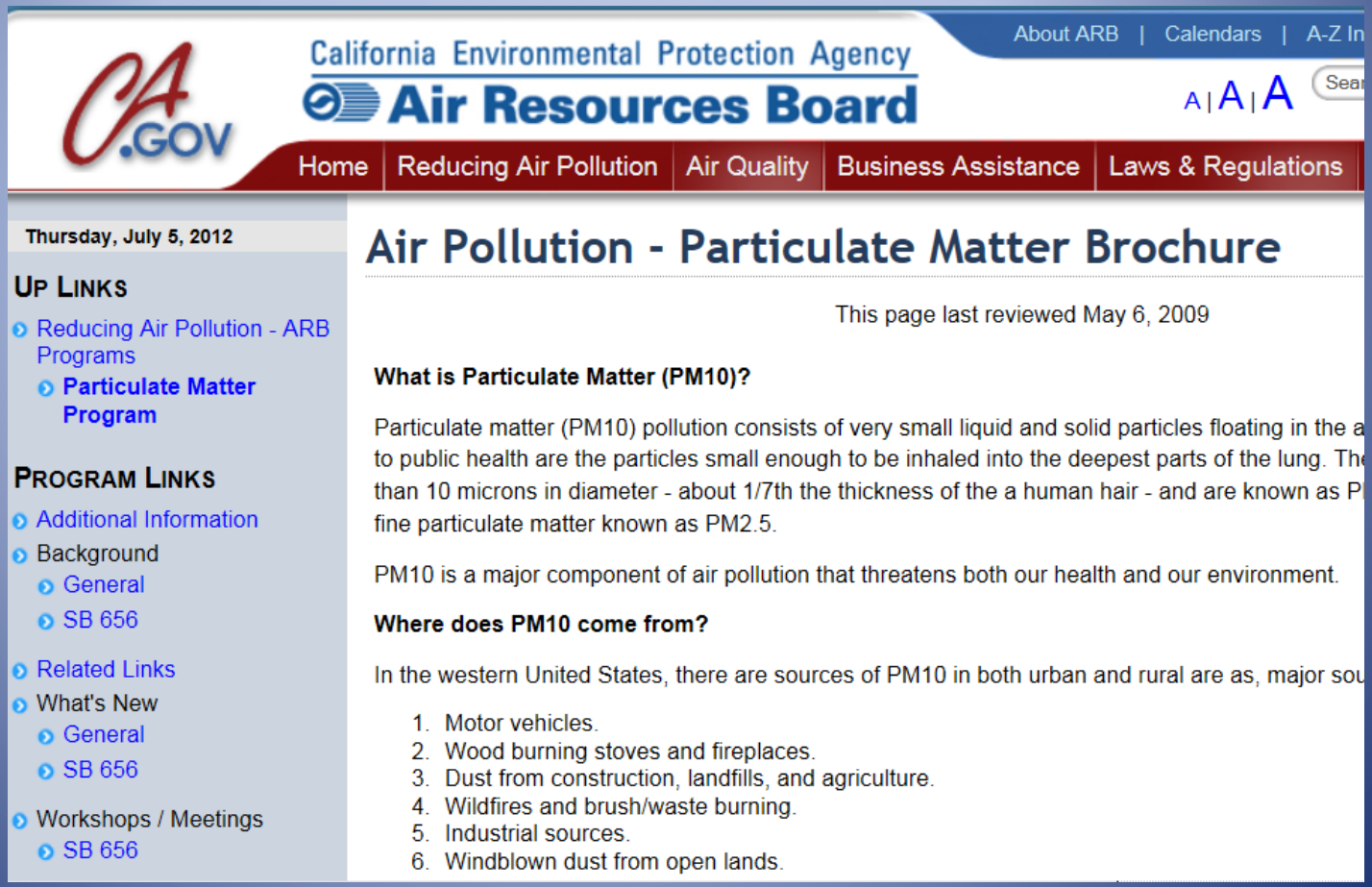
Reset

States

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

CA. AIR RESOURCES BOARD

- **http://www.arb.ca.gov/html/brochure/pm10.htm**



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

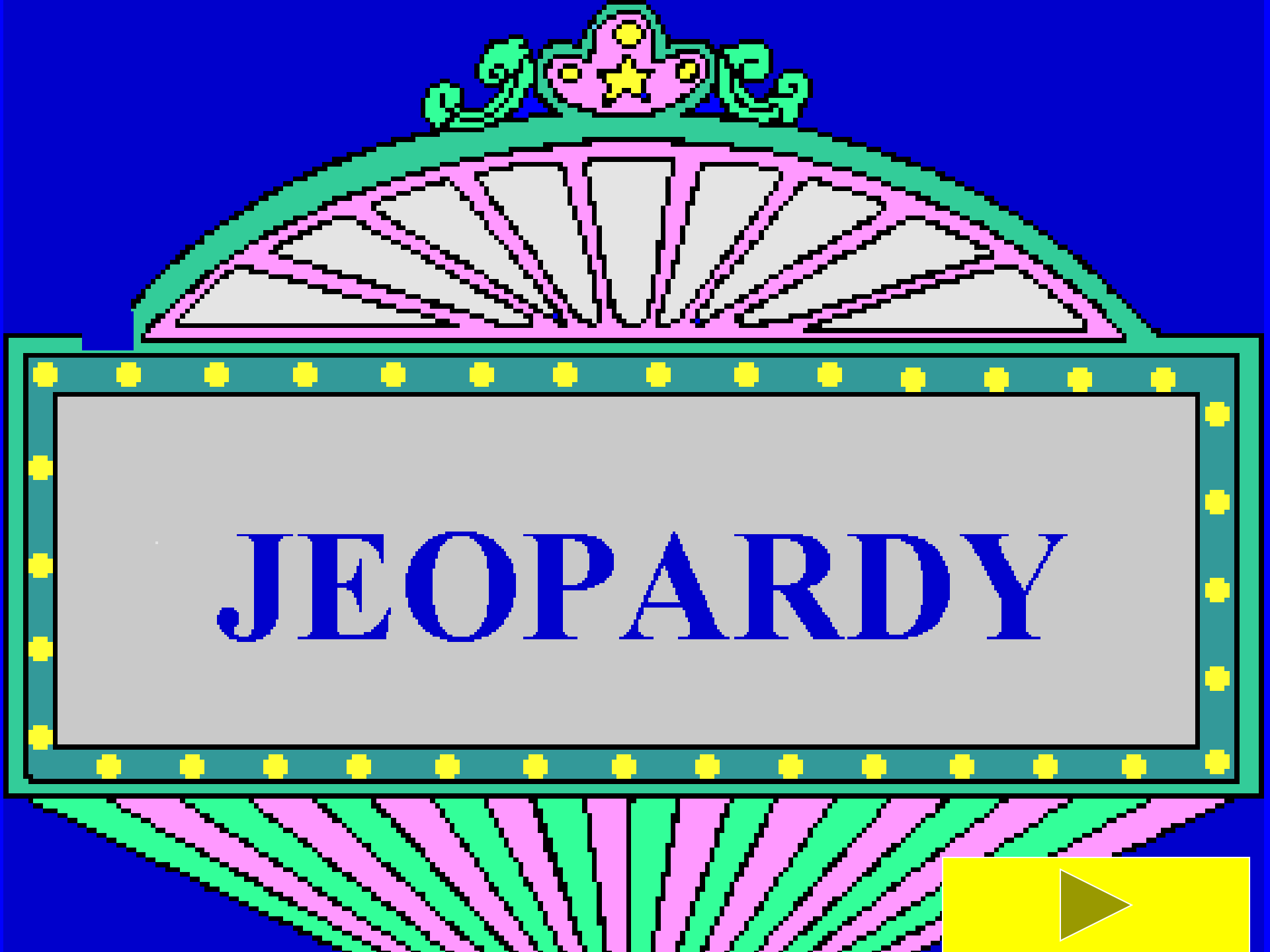
- Landowners
- Contractors/subcontractors/developers
- Off-road vehicle enthusiasts
- Landscape companies, apartment complexes
- Haul and street cleaning companies
- Government agencies
- Schools/youth
- General public
- Media

❖ Background

Why Educate About PM10?

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


QUESTIONS ?


JEOPARDY

Jeopardy

Final Jeopardy

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

PM10 Health Effects .....for 10

One millionth of a meter

PM10 Health Effects
.....for 10

Micron

PM10 Health Effects
.....for 20

The smallest part of the lungs

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

Two regulated sizes of particulate matter

PM10 Health Effects .....for 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 Measures
…..for 10

Grizzly

Control Measures …..for 20

Water, hygroscopic materials, and chemical or organic stabilization materials

Control Measures
…..for 20

Dust Suppressants


DAILY
BIBLE

Control Measures
…..for 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 Measures
…..for 30

Freeboard

Control Measures
…..for 40

Most expensive control measure

Control Measures
…..for 40

Paving

Control Measures
…..for 50

This type of surface meets one of the following:

Visible Crust

Threshold Friction Velocity

Vegetative Cover

Control Measures
…..for 50

Stabilized surface

Rules and Regulations
…..for 10

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

Rules and Regulations
…..for 10

Fugitive Dust

or

Fugitive Emissions

Rules and Regulations
…..for 20

VDE

Rules and Regulations
…..for 20

Visible Dust Emissions

Rules and Regulations
…..for 30

Maximum allowed posted speed limit for unpaved roads on construction sites

Rules and Regulations
…..for 30

15 MPH

Rules and Regulations
…..for 40

Term for manmade dust

Rules and Regulations
…..for 40

Anthropogenic

Rules and Regulations
…..for 50

150 ug/cm^3 over 24 hrs

Rules and Regulations
…..for 50

Ambient Air Quality Standard for PM10

Test Methods
…..for 10

Test method for unpaved roads and unpaved traffic areas

Test Methods
…..for 10

“Visual Determination of Opacity”

Test Methods
…..for 20

VDE is limited to this amount of emission

Test Methods
…..for 20

20% Opacity

Test Methods
…..for 30

TFV

Test Methods
…..for 30

Threshold Friction Velocity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Test Methods
…..for 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 Methods
…..for 50

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

Test Methods
…..for 50

140 ^{0}

Fugitive Dust Sources
…..for 10

The category with the largest percentage of PM emissions

Fugitive Dust Sources
…..for 10

Unpaved Roads

Fugitive Dust Sources
…..for 20

Automobiles

Industrial Facilities

Disturbed Soil

Wood Burning

Fugitive Dust Sources
…..for 20

Manmade sources of Fugitive Dust

Fugitive Dust Sources …..for 30

Construction activities

Disturbed vacant land

Unpaved roads

Trackout

Wind blown dust

Fugitive Dust Sources
…..for 30

Non-point Sources of Fugitive Dust

Fugitive Dust Sources
…..for 40

AADVT

Fugitive Dust Sources
…..for 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 Sources
…..for 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)