Analysis of Particulate Control Measures Effectiveness Interim Report #2

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February 15, 2007

Overview

- February 1st presentation addressed 18 measures
- This presentation addresses remaining 28 measures
- No update of previous 18 measures
- Information available for some measures is incomplete

Measure #7: Increase Fines for Dust Control

Goal is to increase compliance by levying higher penalties.

- Current ceiling of $10,000/day/violation set in
  - ARS Title 49-463
  - ARS Title 49-513
- Enforcement History
  - Prior to July 2005 County Attorney had settlement authority
    - Long backlog (back to 2003)
    - Low average penalty (<$1,000/violation)
  - Enforcement Division assumed settlement authority in July 2005
    - Backlog now roughly 1 year and dropping

Measure #7: Increase Fines for Dust Control (con't)

- Average penalty has increased (~ $5,000/violation)
- Goal is to raise cost of noncompliance above cost of compliance
- While many factors determine fine level, repeat offenders generally have higher fines
- Current levels approaching $10,000, need to change ARS ceilings to go higher

❖ Response to increased fines

- Increase in settlement time / # of meetings / staff burden
- Increased participation of lawyers
- Impact on compliance behavior
  - Behavior change is a lagged response
  - 2006 rule effectiveness underestimates current levels

Measure #7: Increase Fines for Dust Control (con't)

- Not possible to quantify cost effectiveness
  - No elasticity of penalty response available
    - Checks with EPA, CARB and research community found nothing
- Goal is to make noncompliance unprofitable and can be achieved by
  - Increased inspections, NOVs, and fines/year
  - Increase in fines
  - Combination

Measure #8: Establish a Certification Program for Dust Free Developments to Serve as an Industry Standard

Goal is to create a program that provides publicity value to contractors for minimizing construction emissions.

- Fundamentally different approach to dust control (carrot instead of stick)
- Establish criteria that minimize construction emissions
  - Dust control practices
  - Opacity limit
  - Equipment specifications

Measure #8: Establish a Certification Program for Dust Free Developments to Serve as an Industry Standard

- Establish certification process
  - Documentation requirements
  - Measurement/monitoring requirements
  - Inspection requirements
- Establish Public Awareness Program
  - Website
  - Certificates
  - Print/media

Measure #8: Establish a Certification Program for Dust Free Developments to Serve as an Industry Standard

- Cost elements include
  - Program setup
  - Program operation
  - Public awareness
  - Incremental control measures
- Benefits
  - Depends on what other construction control measures are adopted
  - Difference between rule effectiveness and program threshold
  - Participation rate unknown
  - Construction (fugitive dust and exhaust) account for 43% of 2005 inventory

Measure #8: Establish a Certification Program for Dust Free Developments to Serve as an Industry Standard

- Participation rate and cost effectiveness unknown
  - Cost Effectiveness of achieving 80% emission reduction estimated to be $10,752/ton of PM_{10} reduced
  - County admin costs would increase the $/ton value

Measure #10: Just in Time Grading

Goal is to eliminate fugitive dust from cleared land waiting for construction activity.

- Based on a measure implemented in Bullhead City SIP
  - Exceedance days had winds in excess of 20 mph
  - Cleared areas responsible for 73% of PM_{10} inventory
  - Just in time grading focused on minimizing emissions from construction sites under high wind conditions
- Two categories of disturbed land emissions
  - Vehicle operation
  - Wind blown dust
- No benefit for vehicle operation emissions
  - Emissions will occur regardless of whether the land has been stabilized
- No estimate of high wind emissions or cost effectiveness

Measure #11: Establish Continuous Monitoring Requirements for Permitted Sources > 50 Acres

Goal is to measure onsite concentrations so data is available to determine when dust control is needed and project emissions are minimized.

- This measure has been implemented in California
  - CEC required PM_{10} monitoring for power plant construction project
  - Monitoring identified need for additional control on 5% of days
  - Watering used to reduce emissions when high concentrations detected
  - Practical problems in locating monitors for comparison of up wind and down wind values.

Measure #11: Establish Continuous Monitoring Requirements for Permitted Sources > 50 Acres (con't)

- This measure was considered and rejected by the San Joaquin Valley
  - Cost effectiveness was poor because watering was only assumed to occur 5% of time
  - Cost of monitoring was amortized over a small range of benefit
- Two elements of cost
  - Monitoring
  - Watering
- Assuming a baseline rule effectiveness of 50%, and full time use of 1 additional watering truck the cost effectiveness is \$21,530/ton of PM_{10} reduced

Measure #11: Establish Continuous Monitoring Requirements for Permitted Sources > 50 Acres (con't)

- The annual benefits and cost effectiveness of this measure depend on
  - Baseline level of control assumed
  - % of time watering is required

Measure #12: Conduct Mobile Monitoring to Measure PM_{10} and Issue NOVs

Goal is to instrument a vehicle with equipment to measure PM_{10} concentrations at property lines.

- County has received approval to construct a multi-purpose monitoring vehicle
  - $PM_{2.5}$, PM_{10}, NOx, etc.
  - HAPs
- Vehicle will be used to respond to complaints
  - Property line measurements
  - Multi-day measurements

Measure #12: Conduct Mobile Monitoring to Measure PM_{10} and Issue NOVs (con't)

- Not possible to determine cost associated with PM measurement capabilities of County vehicle
  - Bids still out
  - 18-24 months before it becomes operational
- Cost effectiveness based on
  - T&B lease rate for $PM_{2.5}$,PM_{10} equipped van (a vehicle dedicated to PM_{10} enforcement)
  - Skilled inspector
  - Increased sweeping
- Cost effectiveness is $54,000/ton of PM_{10} reduced
- Analysis assumed use of gravel bed to control emissions

Measure #13: Cease Dust Generation Activities During Stagnant Conditions

Goal is to eliminate early morning emissions on winter inversion days when exceedances are imminent.

- Review of ADEQ meteorological data for November 1st through February 15th for the past 3 years shows
  - 8.25 HPA days called
  - 8.80 stagnation days occurred
  - 9.90 exceedances occurred

Measure #13: Cease Dust Generation Activities During Stagnant Conditions (con't)

- Need to investigate industry feasibility
  - Current operating hours
  - Ability to curtail/shift operations
    - business practice
    - statutory deadlines
    - etc.
  - Lead time requirements
  - Cost
- Need to identify potential participants
  - Minimum emission density
  - Notification process
  - Compliance options

Measure #13: Cease Dust Generation Activities During Stagnant Conditions (con't)

- Investigate options to offset costs
  - Tax credit
  - Flexibility
- Limited annual emission reduction
  - Shifted operations provide no reduction
  - Benefits depend on days called, industries/businesses eliminating operations
- Cost effectiveness unknown

Measure #14: Establish Maintenance Requirements for Paved Roads and Parking Lots

Goal is to ensure silt levels on private roads/parking lots are maintained to limit potential for trackout and fugitive dust.

- Rules 310 & 310.01
  - Establish control and stabilization requirements for unpaved surfaces
  - Once an unpaved surface is paved, no subsequent maintenance requirements apply
  - Unpaved surfaces must meet opacity and silt limits

Measure #14: Establish Maintenance Requirements for Paved Roads and Parking Lots (con't)

- Paving is used to control emissions from
  - Trackout
  - Unpaved road
  - Unpaved parking
- Emissions from these sources are not eliminated unless the paved surface is maintained
- Analysis examined benefits of sweeping a parking lot once every 2 weeks
  - Base level assumed to be 2 x Salt River street levels
  - Sweeper efficiency assumed to be 86% (PM_{10} certified sweeper)

Measure #14: Establish Maintenance Requirements for Paved Roads and Parking Lots (con't)

- Cost is based on use of a contract sweeping service
- Cost effectiveness estimated to be $356,350/ton of PM_{10} removed
- Benefits highly dependant on baseline silt assumptions

Measure #15: Conduct Nighttime Inspections

Goal is to reduce emissions from uncontrolled operations conducted at night.

- Current nighttime enforcement is limited
- Recent field study and analysis of monitoring data confirm importance of PM_{10} emitted in predawn hours to exceedances in winter months
- Opacity measurements difficult/impossible to conduct in the dark
- Primary alternative is to monitor concentrations at property line
- Industry response is assumed to be increased watering
  - 2 additional trucks/drivers/facility
  - baseline rule effectiveness of 50%

Measure #15: Conduct Nighttime Inspections (con't)

- Cost elements include
  - Monitoring (1%)
  - Watering (99%)
- Cost effectiveness is estimated to be $10,752/ton of PM_{10} removed

Measure #16: Increase Inspection Frequency for Permitted Facilities

Goal is to increase compliance from permitted facilities through increased inspections.

- Discussions with County indicative that additional staff are required to improve Rule 310 compliance
- Current shortfall in rule effectiveness goal of 80% is 31%
- Current rule effectiveness is probably higher due to lagged response from increased settlement fines
- Increased inspection frequency not expected to achieve gap between current levels and 80% target

Measure #16: Increase Inspection Frequency for Permitted Facilities (con't)

- Combination of measures, education, enforcement, etc. will be needed to fill the gap
- Analysis assumed that increased watering would be used to achieve 80% rule effectiveness
- Cost effectiveness is estimated to be $65,765/ton of PM_{10} reduced

Measure #17: Increase Number of Proactive Inspections in Areas of Highest Emission Densities

Goal is to increase compliance from facilities located in areas with highest emission density.

- Analysis assumed target facilities are inspected twice per day
  - Most emissions generated by haul roads
  - Baseline rule effectiveness of 54% (Rule 316)
  - Watering is primary method of control
- Compliance response
  - Increase haul road watering from once every 2 hours to once/hour

Measure #17: Increase Number of Proactive Inspections in Areas of Highest Emission Densities (con't)

- Cost components
  - Inspection (5%)
  - Increased watering (95%)
- Cost effectiveness is estimated to be $65,900/ton of PM_{10} removed

Measure #18: Notify Violators More Rapidly to Promote Immediate Compliance

Goal is to reduce time allowed for compliance during November-February.

- Discussions with County indicate
  - Rule 310.01 provides 60 days for owners to stabilize disturbances on vacant lots, unpaved lots, etc.
  - NOV is issued after land owner fails to respond to initial compliance letter
  - Experience shows that it frequently takes time to identify owner and resolve problem
  - Earlier compliance depends on
    - owner's financial resources
    - understanding of control options

Measure #18: Notify Violators More Rapidly to Promote Immediate Compliance (con't)

- Some jurisdictions require stabilization after 15 days
- Unpaved parking represents 3% of 2005 PM_{10} inventory
  - No emissions from vacant lots included in the inventory
- Max annual benefits from immediate compliance represents
  - 750 tons (Nov-Feb) or less than 1%
- Actual benefits will be less, compliance unclear assume 25%
  - 0.2% of inventory potential
  - Unknown reduction in vacant lot activity

Measure #18: Notify Violators More Rapidly to Promote Immediate Compliance (con't)

- Cost effectiveness is based on estimates computed for
  - Unpaved parking - $6,100/ton of PM_{10} removed (minimum)
  - Vacant lots - $239,050/ton of PM_{10} removed (maximum)

Measure #19: Fully Implement Rule 316

Goal is to implement fugitive dust revisions adopted in June, 2005.

- Prior to 2005 Revision, Rule 316 contained only emission limitations not fugitive dust control measures
- Facilities subject to Rule 316 were required to comply with Rule 310 fugitive due controls
- Revisions adopted following controls
  - Applying dust suppressants
  - Installing and maintaining ramble grates, wheel washers/vehicle washers and truck washers
  - Installing and maintaining gravel pads from rumble grates, washers to facility exits
  - Paving from rumble grates to wheel washers/vehicle washers

Measure #19: Fully Implement Rule 316 (con't)

- Stabilizing haul/access roads and facility entries and exits
- Stabilizing open storage piles and material handling
- Ceasing active operations during a high wind event
- Cleaning paved internal roads

- Cost Effectiveness (per rulemaking pursuant to ARS 49-112)
  - Large-sized Facility $4,802 - $5,501
  - Medium-sized Facility #1 $6,417 - $7,437
  - Medium-sized Facility #2 $9,126 - $10,678
  - Small-sized Facility $30,087-$59,750

Measure #20: Require Private Companies to Use PM_{10} Certified Street Sweepers

Goal is to reduce silt levels on paved surfaces through increased sweeping.

- Same objective as Measure 14 (Establish Maintenance Requirements for Paved Roads & Parking Lots)
- Same analysis assumptions
- Some cost effectiveness $356,350/ton of PM_{10} reduced
- Benefits highly dependant on baseline silt assumptions

Measure #21: Shift Hours of Operation During Stagnant Conditions in November Through February

Goal is to eliminate early morning emissions on winter inversion days when exceedances are imminent.

- Same objective as Measure 13 (Cease Dust Generation Activities During Stagnant Conditions)
- Primary difference is that this measure does not reduce emissions
  - Shifted operations provide no reduction
  - No daily or annual emission benefits
- Provides substantial aid to demonstrating attainment at monitors

Measure #21: Shift Hours of Operation During Stagnant Conditions in November Through February (con't)

- Cost to industry for shifting hours of operation is unknown, need to investigate
  - Threshold for participation (emissions density)
  - Feasibility
  - Options to offset costs

Measure #22: Model Cumulative Impacts for Newer Modified Stationary Sources

Goal is to place a cap on growth in PM_{10} emission density.

- New source review requirements generally not applicable to fugitive sources
- This measure would require modeling for new/modified facilities to account for emissions from adjacent facilities
- Emissions causing concentrations to exceed a threshold (e.g. ambient standard) would need to be offset
- No market for offsets currently exists in Maricopa County
- Costs of offsets would encompass range of measures examined

Measure #22: Model Cumulative Impacts for Newer Modified Stationary Sources (con't)

- Incremental cost of additional modeling is considered negligible
- Low cost and high efficiency measures are available as presented in this analysis
- Some measures are not accessible to private industry (e.g., increased enforcement, etc.)
- Lowest cost control for industry is \$109/ton of PM_{10} removed for paving unpaved roads

Measure #23: Conduct Nighttime and Weekend Inspections

Goal is to reduce emissions from uncontrolled operations conducted at night and on weekends.

- Same as Measure 15 (Conduct Nighttime Inspections)
- Assume same level of inspection and same industry response
- Since monitoring is only 1% of overall cost, no difference in cost effectiveness between nights and weekend inspections
  - Estimated to be $10,752/ton of PM_{10} removed

Measure #26: Reduce Off-Road Vehicle Use In Areas With High Off-Road Vehicle Activity

Goal is to expand Goodyear ATV and OHV restrictions to the nonattainment area.

- Good year ordinance does not allow ATVs and OHVs to operate on unimproved property without written permission of the property owner
- Prior written permission must include
  - Name, address and phone number of person granting permission
  - Interest of person granting permission (e.g., owner, lessee, etc.)
  - If the person granting permission is not the owner, the name, address and phone number of the owner

Measure #26: Reduce Off-Road Vehicle Use In Areas With High Off-Road Vehicle Activity (con't)

- Period of time permission to use the property is being granted
- Signature of person granting permission

- Enforcement
  - By Police Department
  - Misdemeanor offense with fine up to $2,500 and/or 6 months imprisonment
- Benefits
  - 2.1% of passive open space in nonattainment area
  - 45.3 tons/year using 2005 inventory data

Measure #26: Reduce Off-Road Vehicle Use In Areas With High Off-Road Vehicle Activity (con't)

- Costs
  - Placed 30 signs
  - Purchased off-road vehicle
  - Distributed brochures
  - No additional staff time required
- Cost Effectiveness is estimated to be $230/ton of PM_{10} removed
- Implementation
  - Most activity ceased within a week
  - No arrests

Measure #29: Sweep Streets with PM_{10} Certified Street Sweepers

Goal is to ensure that all cities and towns use PM_{10} certified street sweepers.

- PM10 certified sweepers purchased in recent years with CMAQ funds, etc.
  - Many uncertified sweepers still in use
- PM_{10} certified sweepers are 50% more efficient than noncertified sweepers (86% vs. 55% reduction in silt loading)
- Recent research from UC Riverside in Clarke County indicates that PM_{10} certified sweepers should be used exclusively on roads with high silt loadings

Measure #29: Sweep Streets with PM_{10} Certified Street Sweepers (con't)

- Marginal cost of certified sweepers is low approximately $3,500/vehicle
- Cost effectiveness is estimated to be $302/ton of PM_{10} removed

Measure #31: Repave or Overlay Paved Roads with Rubberized Asphalt

Goal is to reduce PM_{10} emitted from tire wear by paving roads with rubberized asphalt.

- ADOT study found tire wear emissions are 30-50% lower on rubberized asphalt than on Portland Concrete Cement (PCC)
- Reductions are due to an improvement in the roughness and frictional characteristics of the pavement surface
- MOBILE6 estimates tire wear PM_{10} emissions at the rate of 0.010 g/mi weighted for vehicle distribution operating in nonattainment areas

Measure #31: Repave or Overlay Paved Roads with Rubberized Asphalt (con't)

- Emission benefits depend on ADT levels
  - High: 17,000/lane mile/day (freeway)
  - Medium: 4,000/lane mile/day (arterial)
  - Low: 2,500/lane mile/day (major collector)
- Cost of rubberized asphalt is estimated to be
  - $183,333 lane mile
  - annualized cost of $21,450/year (20 year useful life)
- Cost effectiveness assuming 50% reduction
  - High: $631,000/ton
  - Medium: $2,681,000/ton
  - Low: $4,290,000/ton

Measure #31: Repave or Overlay Paved Roads with Rubberized Asphalt (con't)

- Marginal cost of rubberized asphalt vs. PCC could improve cost effectiveness
  - Lower cost per lane mile
  - Shorter life span
- Cost effectiveness not relevant in light of voter endorsement of sales tax and use of rubberized asphalt
- Benefits for miles of rubberized asphalt not included in 2005 inventory
- Scheduled paving will contribute annual PM_{10} reductions

Measure #38: Strengthen and Increase Enforcement of Rule 310.01 for Vacant Lots

Goal is to reduce vacant land disturbance and wind blown dust emissions.

- 2005 inventory has several emission estimates for vacant land
  - Unpaved parking
  - ATV activity
  - Wind blown
  - No estimate for vehicle disturbance

Measure #38: Strengthen and Increase Enforcement of Rule 310.01 for Vacant Lots (con't)

- Proposed measures apply to different categories of activity
  - Measure 32 (unpaved parking lots – Phoenix Parking Code)
  - Measure 26 (offroad vehicle use – Goodyear ordinance)
  - Measures 38 - 41 (vehicle disturbance and wind blown dust)
- No estimate of vehicle disturbance activity available
- Emissions analysis based on assumed average trespass rate/vacant lot

Measure #38: Strengthen and Increase Enforcement of Rule 310.01 for Vacant Lots (con't)

- Cost elements include
  - Inspection cost
  - Trespass barrier
- Trespass rate reduction assumed to be 100%
- Cost effectiveness is estimated to be $239,000/ton of PM_{10} removed
- No estimate of wind blown dust included
- Benefits dependent on assumed trespass rate

Measure #39: Restrict Vehicular Use and Parking on Vacant Lots

Goal is to reduce vacant lot trespass and emissions.

- Same issues and analysis methodology used for Measure 38 except no enforcement cost included
- This analysis quantifies the cost effectiveness of trespass barriers only
- Reduction in trespass rate assumed to be 100%
- Cost effectiveness is estimated to be $230,700/ton of PM_{10} removed
- No estimate of wind blown dust included
- Benefits dependent on assumed trespass rate

Measure #40: Enhanced Enforcement of Trespass Ordinances and Codes

Goal is to reduce trespass rate and emissions through increased enforcement.

- Analysis examines the cost effectiveness of increased enforcement aimed at trespassers
  - Same assumptions about trespass rates and emissions
  - Trespass barriers not included
  - Cost of posting signs included
  - Cost of additional law enforcement officers included
- Reduction in trespass rate assumed to be 75%
- Cost effectiveness is estimated to be $51,600/ton of PM_{10} removed

Measure #40: Enhanced Enforcement of Trespass Ordinances and Codes (con't)

- Discussions with County indicate it is rare for inspectors to witness vacant lot trespass except in high ATV use areas
- No estimate of wind blown dust included
- Benefits dependent on assumed baseline trespass rate

Measure #41: Vacant Lots Stabilized By County If Owners Do Not Respond

Goal is to eliminate fugitive dust from vacant lots cited for disturbed surfaces.

- Analysis examines cost effectiveness of increased enforcement aimed at property owners
  - Same assumptions about trespass rate and emissions
  - Inspection and lien processing costs included
  - Trespass barrier cost included
- Reduction in trespass rate assumed to be 100%
- Cost effectiveness estimated to be $235,700/ton of PM_{10} removed
- No estimate of wind blown dust included
- Benefits dependent on assumed baseline trespass rate

Measure #42: Schedule Improvements on Parallel Streets to Retain Alternate Route Options Along Major Corridors

Goal is to enhance capacity of parallel roads to improve traffic flow along key corridors, and reduce congestion and vehicle emissions.

- Measure is focused on reducing exhaust emissions
  - Impact on exhaust pollutants depends on baseline speed and pollutant
- Vehicle exhaust represents 1% of PM_{10} emitted in 2005 inventory

Measure #42: Schedule Improvements on Parallel Streets to Retain Alternate Route Options Along Major Corridors (con't)

- Impact of speed on components of vehicle PM emissions
  - Exhaust – Sulfate component of exhaust only
  - Brake – No Impact
  - Tire – No Impact
  - Fugitive Dust – No Impact
- Potential benefit is extremely limited and cost effectiveness per ton of PM_{10} reduced extremely poor

Measure #43: Build Park and Ride Lots Earlier

Goal is to reduce emission by decreasing the number of single occupancy vehicles on the road.

- Park and ride facilities reduce VMT by facilitating use of transit and carpools
- Reduced VMT eliminates trip related exhaust and fugitive dust emissions
- Emission benefits only accrue to years in which the park and ride lots would not have been constructed
- Use of transit has PM_{10} drawbacks
  - Higher exhaust emissions of PM_{10} relative to cars (Diesel vs. gasoline)
  - Higher fugitive dust relative to cars

Measure #43: Build Park and Ride Lots Earlier (con't)

- Transit bus exhaust PM is almost 100 times higher than light duty vehicle PM
  - Diesel buses would need to be retrofitted with traps to offset the increase
- PM analysis of paved road fugitive dust shows that
  - A typical transit bus, when fully loaded (100% ridership), will reduce emissions by 20% compared to car trips
  - If , however, bus ridership drops below 75%, car trips produce less emissions than a single bus trip
- Park and ride lots will reduce PM_{10} emissions
  - If carpools are used
  - If transit buses are operated at a minimum capacity of 75%

Measure #43: Build Park and Ride Lots Earlier (con't)

- Benefits of this measure will be confined to years in which current plans are accelerated and will be quite limited
- Cost effectiveness is not attractive for PM_{10} control

Measure #44: Coordinate Public Transit Services with Pinal County

Goal is to shift single occupant commute travel into transit and reduce VMT and emissions.

- Pinal County currently has no transit service
  - Valley Metro/ADOT provide support for carpooling
  - Local trip reduction program for Area 'A' portion of County
- Issues similar to those noted in park and ride evaluation
  - Transit has PM_{10} draw backs
  - Need to constantly achieve minimal ridership levels to provide benefit
  - Cost effectiveness is not attractive for PM_{10} control

Measure #45: Increase Fines for Open Burning

Goal is to decrease emissions from uncontrolled burns by raising the cost of noncompliance.

- Current penalty is set in ARS Title 49-501
  - $25/occurence and is not a significant deterrent
- 2005 PM_{10} Inventory
  - Contains emission estimates for controlled burns
  - No estimate for uncontrolled burns
  - Controlled burns represent 0.01% of the 2005 inventory
- No data on number or size of uncontrolled burns
  - Only information is from complaints (roughly double the number of controlled burns)

Measure #45: Increase Fines for Open Burning (con't)

- Data needed to estimate cost effectiveness not available
- While magnitude of emissions appears small, recent field study shows that emissions and potential impacts from uncontrolled burns can be significant
- Penalty needs to be increased to deter activity
- Since burning is not a continuous activity, level of the fine is important for deterrence (in contrast to Measure #7)
- Statute would need to be revised to raise the fine

Measure #46: Restrict Use of Outdoor Fireplaces, Pits and Ambience Fireplaces in the Hospitality Industry

Goal is to close loopholes in existing rates and reduce emissions from nonessential fireplace use.

- Current restrictions
  - ARS Title 9 – 500.16 sets clean burning fireplaces standards for homes constructed after 1998
  - Rule 318 – sets standards for approval of wood burning devices
  - Residential Wood Burning Restriction Ordinance prohibits burning during periods of high PM_{10} concentrations (October - February) on HPA Days

Measure #46: Restrict Use of Outdoor Fireplaces, Pits and Ambience Fireplaces in the Hospitality Industry (con't)

- Exemptions
  - ARS Title 9 – 500.16 allows exemptions for outdoor fireplaces and pre-1999 fireplaces/stoves
  - Rule 318 does not exempt hotels/motels
  - Wood Burning Ordinance – exempts sole source/temporary source of heat, emergency, etc.
- Fines of up to $100 per violation
- Emissions from outdoor fireplaces, pits and ambient heating in hospitality industry are not included in the 2005 inventory

Measure #46: Restrict Use of Outdoor Fireplaces, Pits and Ambience Fireplaces in the Hospitality Industry (con't)

- Compliance options include
  - Replacement with clean burning fireplace/stove
  - Restrict use on HPA days
- Cost effectiveness depends on compliance approach (per MSM Analysis)
  - Curtailment: $132,000/ton
  - Retrofit: $190,000/ton
- Since enforcement already restricts burning on HPA days, the marginal cost of cost of extending those restrictions to other sources should be minimal

2007 MAG PM_{10} Control Measures Ranked by Increasing Cost-Effectiveness

NO.	DESCRIPTION	COST-EFFECT. ($/TON PM_{10})
22	Model Cumulative Impacts for New or Modified Existing Sources	$109
26	Reduce Off-Road Vehicle Use in High Off-Road Activity Areas (Including Vehicle Impoundment for Repeat Violators)	$230
29	Sweep Streets With PM10-Certified Street Sweepers	$302
8	Establish Certification Program for Industry-Standard Dust-Free Developments	$10,752
15	Conduct Nighttime Inspections	$10,752
23	Conduct Nighttime and Weekend Inspections	$10,752
11	Establish Continuous Monitoring Requirements for Permitted Sources Over 50 Acres	$21,530
19	Fully Implement Rule 316	$4,802 - 59,750
40	Enhanced Enforcement of Trespass Ordinances & Codes	$51,580
12	Conduct Mobile Monitoring to Measure PM-10 and Issue NOVs	$54,233
16	Increase Inspection Frequency for Permitted Facilities	$65,765
17	Increase Number of Proactive Inspections in Areas of Highest PM-10 Emission Densities	$65,899
46	Restrict Use of Outdoor Fireplaces & Pits and Ambience Fireplaces in Hospitality Industry	$132,000 - 190,000
39	Restrict Vehicular Use & Parking on Vacant Lots	$230,724
41	Vacant Lots Stabilized by County if Owners Do Not Respond, Including Use of Property Liens	$235,694
38	Strengthen & Increase Enforcement of Rule 310.01 for Vacant Lots	$239,050
14	Establish Maintenance Requirements for Paved Roads & Parking Lots	$356,351
20	Require Private Companies to Use PM-10 Certified Sweepers on Paved Areas (Including Parking Lots)	$356,351
31	Repave or Overlay Paved Roads with Rubberized Asphalt	$630,882 - 4,290,000

2007 MAG PM_{10} Control Measures with Unknown Cost-Effectiveness

NO.	DESCRIPTION	COST-EFFECT. ($/TON PM_{10})
21	Shift Hours of Operation During Stagnant Conditions in November-February	NA
42	Schedule Improvements on Parallel Streets to Retain Alternate Route Options Along Major N/S & E/W Corridors	NA
43	Build Park and Ride Lots Earlier	NA
44	Coordinate Public Transit Services with Pinal County	NA
7	Increase Fines for Dust Control Violations & Publish Violators List	Unknown
10	Conduct Just-In-Time Grading	Unknown
13	Cease Dust Generation Activities During Stagnation Conditions	Unknown
18	Notify Violators More Rapidly to Promote Immediate Compliance	Unknown
45	Increase Fines for Open Burning (Currently $25)	Unknown

Next Steps

- Update analysis of first 18 measures
- Address comments received today
  - Add in wind emissions for vacant lots
- Prepare written measure descriptions
- Circulate report