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April 19, 2007

TO: Members of the MAG Air Quality Technical Advisory Committee

FROM: Stephen S. Cleveland, Goodyear City Manager, Chairman

SUBJECT: MEETING NOTIFICATION AND TRANSMITTAL OF TENTATIVE AGENDA

Thursday, April 26, 2007 - 1:30 p.m.
MAG Office, Suite 200 - Saguaro Room
302 North 1st Avenue, Phoenix

Please park in the garage underneath the building. Bring your ticket to the meeting; parking will be validated. For those using transit, the Regional Public Transportation Authority will provide transit tickets for your trip. For those using bicycles, please lock your bicycle in the bike rack in the garage.

Pursuant to Title II of the Americans with Disabilities Act (ADA), MAG does not discriminate on the basis of disability in admissions to or participation in its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Jason Stephens at the MAG office. Requests should be made as early as possible to allow time to arrange the accommodation.

Members of the MAG Air Quality Technical Advisory Committee may attend in person, via video conference or by telephone conference call. Those attending by video conference must notify the MAG site three business days prior to the meeting. Those attending by telephone conference call are requested to call (602) 261-7510 between 1:25 p.m. and 1:30 p.m. on the date of the meeting. After the prompt, please enter the meeting ID number 27822 (on your telephone key pad) followed by the pound key. If you have a problem or require assistance, dial 0 after calling the number above.

Please be advised that under procedures approved by the MAG Regional Council, all MAG committees need to have a quorum to conduct the meeting. A quorum is a simple majority of the membership. If you are unable to attend the meeting, please make arrangements for a proxy from your entity to represent you.

A Voluntary Association of Local Governments in Maricopa County

City of Apache Junction ▲ City of Avondale ▲ Town of Buckeye ▲ Town of Carefree ▲ Town of Cave Creek ▲ City of Chandler ▲ City of El Mirage ▲ Fort McDowell Yavapai Nation ▲ Town of Fountain Hills ▲ Town of Gila Bend
Gila River Indian Community ▲ Town of Gilbert ▲ City of Glendale ▲ City of Goodyear ▲ Town of Guadalupe ▲ City of Litchfield Park ▲ Maricopa County ▲ City of Mesa ▲ Town of Paradise Valley ▲ City of Peoria ▲ City of Phoenix
Town of Queen Creek ▲ Salt River Pima-Maricopa Indian Community ▲ City of Scottsdale ▲ City of Surprise ▲ City of Tempe ▲ City of Tolleson ▲ Town of Wickenburg ▲ Town of Youngtown ▲ Arizona Department of Transportation

TENTATIVE AGENDA

COMMITTEE ACTION REQUESTED

1. Call to Order

2. Call to the Audience

An opportunity will be provided to members of the public to address the Air Quality Technical Advisory Committee on items not scheduled on the agenda that fall under the jurisdiction of MAG, or on items on the agenda for discussion but not for action. Members of the public will be requested not to exceed a three minute time period for their comments. A total of 15 minutes will be provided for the Call to the Audience agenda item, unless the Air Quality Technical Advisory Committee requests an exception to this limit. Please note that those wishing to comment on action agenda items will be given an opportunity at the time the item is heard.

3. Approval of the March 29, 2007 Meeting Minutes

4. Additional PM-10 Measures Recommended by Maricopa County for the Suggested List

On March 28, 2007, Maricopa County Supervisor Don Stapley, presented a memo at the MAG Regional Council meeting which recommended additional PM-10 measures for the Suggested List and identified some concerns. At the meeting, the MAG Regional Council took action to approve the Suggested List of Measures to Reduce PM-10 Particulate Matter as recommended by the MAG Air Quality Technical Advisory Committee and the MAG Management Committee with one modification and one addition (1) to Measure #38 Restrict vehicle use and parking on vacant lots (e.g. Phoenix) by adding the State to the list of implementing authorities; (2) to add a measure to the Suggested List to grant Maricopa County the ability to assess liens on parcels to cover the costs of stabilization for

2. For information.

3. Review and approve the March 29, 2007 meeting minutes.

4. For information, discussion and possible action.

the parcel; also to direct the MAG Air Quality Technical Advisory Committee at their April meeting to consider the remainder of the recommendations provided in the March 28, 2007 memorandum from Maricopa County to MAG.

At this meeting, the Air Quality Technical Advisory Committee will consider the remainder of the recommendations in the memo. Please refer to the enclosed material.

5. Status Report on the Maricopa County 2005 Periodic Emissions Inventory for PM-10

The Maricopa County Air Quality Department has been in the process of refining the Maricopa County 2005 Periodic Emissions Inventory for PM-10. A status report will be provided.

6. Final Report on the Analysis of Particulate Control Measure Cost Effectiveness

The Final Report on the Analysis of Particulate Control Measure Cost Effectiveness by Sierra Research, MAG consultant, has been completed. Comments received from the Committee have been addressed in the report. Please refer to the enclosed material.

7. Gila River Indian Community Air Quality Management Plan

A presentation will be given on the Gila River Indian Community (GRIC) Air Quality Management Plan. The presentation will include a discussion of background on the GRIC; types of air pollution sources; Tribal Implementation Plan elements; fugitive dust issues/ordinance/earthmoving permit and dust control plan; and next step/permitting.

8. Ozone Control Measures

The Arizona Department of Environmental Quality will give a presentation on additional

5. For information and discussion.

6. For information and discussion.

7. For information and discussion.

8. For information, discussion and possible action.

potential ozone control measures. The measures include Expand Area A, Liquid Leaker Test, and Ban on Open Burning During the Ozone Season. Please refer to the enclosed material.

9. Call for Future Agenda Items

The next meeting of the Committee has been tentatively scheduled for **Thursday, May 22, 2007 at 1:30 p.m.** The Chairman will invite the Committee members to suggest future agenda items.

9, For information and discussion.

MINUTES OF THE
MARICOPA ASSOCIATION OF GOVERNMENTS
AIR QUALITY TECHNICAL ADVISORY COMMITTEE MEETING

Thursday, March 29, 2007
MAG Office
Phoenix, Arizona

MEMBERS PRESENT

Stephen Cleveland, City of Goodyear, Chairman
Jess Segovia, Avondale
Michael Salisbury for Lucky Roberts, Buckeye
#Jim Weiss, Chandler
#Jamie McCullough, El Mirage
Lisa Taraborelli for Tami Ryall, Gilbert
Doug Kukino, Glendale
Scott Bouchie, Mesa
Joe Gibbs for Gaye Knight, Phoenix
Andrew Kocisky for Larry Person, Scottsdale
#Amy Scott for Antonio DeLaCruz, Surprise
Oddvar Tveit, Tempe
*Walter Bouchard, Citizen Representative
Corey Woods, American Lung Association of Arizona
Wendy Crites for Barbara Sprungl, Salt River Project
Brian O'Donnell, Southwest Gas Corporation
Mark Hajduk, Arizona Public Service
Company
#Vic Dugan for Gina Grey, Western States Petroleum
Association
Betsy Turner for Randi Alcott, Valley Metro
Dave Berry, Arizona Motor Transport Association
Jeannette Fish, Maricopa County Farm Bureau
Russell Bowers, Arizona Rock Products Association
*Michelle Rill, Greater Phoenix Chamber of Commerce

*Members neither present nor represented by proxy.
#Participated via telephone conference call.
+Participated via video conference call.

OTHERS PRESENT

Lindy Bauer, Maricopa Association of Governments
Cathy Arthur, Maricopa Association of Governments
Taejoo Shin, Maricopa Association of Governments
Dean Giles, Maricopa Association of Governments
Julie Hoffman, Maricopa Association of Governments
Patrisia Navarro, Maricopa Association of Governments
Ieesuck Jung, Maricopa Association of Governments
Matt Clark, Maricopa Association of Governments
Dennis Fitz, University of Southern California,
Riverside
Diane Arnst, Arizona Department of Environmental
Quality
Scott Di Biase, Pinal County Air Quality
Mario Saldamando, City of Goodyear

Amanda McGennis, Associated General
Contractors
Spencer Kamps for Connie Wilhelm-Garcia,
Homebuilders Association of Central Arizona
*Stephen J. Andros, American Institute of
Architects - Central Arizona
#Mannie Carpenter, Valley Forward
*Kai Umeda for Patrick Clay, University of Arizona
Cooperative Extension
Beverly Chenausky, Arizona Department of
Transportation
Peter Hyde, Arizona Department of Environmental
Quality
#Wienke Tax, Environmental Protection Agency
Jo Crumbaker, Maricopa County Air Quality
Department
*Duane Yantorno, Arizona Department of Weights
and Measures
*Ed Stillings, Federal Highway Administration
*Judi Nelson, Arizona State University
*B. Bobby Ramirez, Salt River Pima-Maricopa
Indian Community
*David Rueckert, Citizen Representative

Steve Trussell, Arizona Rock Products Association
Jody Noble, Environmental Stabilization Solutions
Jane McVay, Arizona Department of
Transportation
Craig Anderson, East Valley Tribune
Barb Sylvester, Brown & Caldwell
Shane Kiesow, City of Apache Junction
Randy Harrison, D.L. Withers Construction
Maureen Zeise, Inter Tribal Council of Arizona
Daniel Blair, Gila River Indian Community
Roman Orona, Ak-Chin Indian Community
Kendra Tso, Ak-Chin Indian Community
Andrea Martin, Arizona Department of Agriculture
#Doris Lo, Environmental Protection Agency

1. Call to Order

A meeting of the MAG Air Quality Technical Advisory Committee was conducted on March 29, 2007. Stephen Cleveland, City of Goodyear, Chair, called the meeting to order at approximately 1:40 p.m. Jamie McCullough, City of El Mirage; Jim Weiss, City of Chandler; Amy Scott, City of Surprise; Mannie Carpenter, Valley Forward; Wienke Tax, Environmental Protection Agency; Doris Lo, Environmental Protection Agency; and Vic Dugan, Exxon Mobil, attended the meeting via telephone conference call.

2. Call to the Audience

Mr. Cleveland stated that, according to the MAG public comment process, members of the audience who wish to speak are requested to fill out comment cards, which are available on the table adjacent to the doorway inside the meeting room. Citizens are asked not to exceed a three minute time period for their comments. Public comment is provided at the beginning of the meeting for nonagenda items and nonaction agenda items. Mr. Cleveland noted that no public comment cards had been received.

3. Approval of the March 1, 2007 Meeting Minutes

The Committee reviewed the minutes from the March 1, 2007 meeting. Peter Hyde, Arizona Department of Environmental Quality, requested changes to the first full paragraph on page four of the minutes. He stated that heights should be changed to meters. Russell Bowers, Arizona Rock Products Association, moved and Scott Bouchie, City of Mesa, seconded and the motion to approve the March 1, 2007 meeting minutes as corrected carried unanimously.

4. Approval of the March 6, 2007 Meeting Minutes

The Committee reviewed the minutes from the March 6, 2007 meeting. Lisa Taraborelli, Town of Gilbert, moved and Joe Gibbs, City of Phoenix, seconded and the motion to approve the March 6, 2007 meeting minutes carried unanimously.

5. Approval of the March 9, 2007 Meeting Minutes

The Committee reviewed the minutes from the March 9, 2007 meeting. Corey Woods, American Lung Association of Arizona, moved and Mark Hajduk, Arizona Public Service Company, seconded and the motion to approve the March 9, 2007 meeting minutes carried unanimously.

6. Status Report on Agricultural Measures

Jeannette Fish, Maricopa County Farm Bureau, provided a status report on agricultural measures. She indicated that the Governor's Agricultural Best Management Practices (BMPs) Committee met on February 20, 2007 and voted to double the requirements for farmers within the PM-10 nonattainment area. Ms. Fish stated that farmers with 10 acres or more would be required to implement two BMPs on each land category instead of the current one. Mr. Cleveland inquired about the land categories. Ms. Fish responded that there are the three categories: tillage and harvest, noncropland, and cropland. She indicated that the Governor's Agricultural BMPs Committee also added one more BMP which is to refrain from tillage between 2:00 and 8:00 a.m. on High Pollution Advisory days for PM-10 under stagnation conditions at their February 20, 2007 meeting.

Ms. Fish reviewed the four new BMPs adopted in January 2007: precision farming, transgenic crops, green chop, and integrated pest management. She indicated that the agricultural community will ask that the full rule-making procedure be waived so that new requirements and BMPs will take effect very quickly, hopefully by June. She indicated that doubling the requirements for farmers within the PM-10 nonattainment area would be a change in law. The other BMPs are a rule-making procedure. Ms. Fish stated that once the rules are in place the next steps are education to make farmers aware of the changes in rules and publication of new Guide to Agricultural PM-10 Best Management Practices booklet. She mentioned that the Arizona Department of Agriculture has set aside funds.

Mr. Bowers commented on agricultural activity on tribal lands during high wind days. He inquired about BMPs on tribal lands. Ms. Fish replied that the State of Arizona cannot govern tribal lands; however, the tribes, in general, have already adopted a general requirement to ask farmers to follow the BMPs. She stated that to her knowledge, they are using BMPs.

Mr. Bowers requested a presentation on the Gila River Indian Community Tribal Implementation Plan (TIP). Daniel Blair, Gila River Indian Community, stated that the TIP was recently finalized and is in the process of being submitted to the Environmental Protection Agency (EPA) so that it is federally enforceable. Mr. Bowers indicated that a presentation would be informative to see if there is a correlation of efforts. Wienke Tax, Environmental Protection Agency, clarified that the TIP is not specifically a PM-10 nonattainment plan. It is a more general air quality management plan. She stated that Colleen McKaughan, EPA, will be consulting with the tribes on the agricultural measures. Mr. Cleveland requested that Mr. Blair work with MAG staff on a presentation for a future meeting.

7. Update on the Five Percent Plan for PM-10

Lindy Bauer, Maricopa Association of Governments, provided an update on the Five Percent Plan for PM-10. She indicated that on March 14, 2007, the MAG Management Committee unanimously recommended the Suggested List of Measures to Reduce PM-10 Particulate Matter. At the meeting, it was suggested that the MAG member agencies prepare a list of county unpaved roads that are within the jurisdictions (county island unpaved roads) to assist the Maricopa County Department of Transportation. She stated that the MAG Regional Council met on March 28, 2007 and were requested to take action on the Suggested List of Measures. Prior to the meeting, a memorandum was received from Don Stapley, Supervisor District 2, Maricopa County, with comments on the Suggested List of Measures, which was transmitted to the MAG Air Quality Technical Advisory Committee and MAG Management Committee. In addition, the memorandum is provided at each place. Ms. Bauer stated that the MAG Regional Council took action to approve the Suggested List of Measures to Reduce PM-10 Particulate Matter as recommended by the MAG Air Quality Technical Advisory Committee and the MAG Management Committee with one modification and one addition: (1) to Measure #38 Restrict vehicle use and parking on vacant lots (e.g. Phoenix) by adding the State to the list of implementing authorities; and (2) to add a measure to the Suggested List to grant Maricopa County the ability to assess liens on parcels to cover the costs of stabilization for the parcel; also to direct the MAG Air Quality Technical Advisory Committee at their April meeting to consider the remainder of the recommendations provided in the March 28, 2007 memorandum from Maricopa County to MAG.

Mr. Cleveland asked which measure pertains to the lien provision. Ms. Bauer replied that there was a vacant lot lien measure; however, Maricopa County had concerns when the measure was going through the process about being able to recover the costs. Therefore, the measure was not

recommended. She stated the County has since decided that this would be a good measure. Ms. Bauer indicated that MAG staff will meet with Maricopa County to prepare the language for what the County needs and what the MAG Regional Council has added to the Suggested List of Measures. Mr. Cleveland asked if the measure would need to go the MAG Regional Council for approval. Ms. Bauer replied that the language approved by the MAG Regional Council will be used to add the measure to the Suggested List of Measures.

Mr. Cleveland stated that Maricopa County will report on the comments in the memorandum. He indicated that this item is for information and discussion. Any action would need to be taken at the April meeting due to the requirements of the open meeting law.

Jo Crumbaker, Maricopa County Air Quality Department, stated that the County had concerns about a number of the measures being taken off the Suggested List before it went to the MAG Regional Council. She mentioned the financial and manpower challenges of the Five Percent Plan for PM-10 and indicated that measures should be kept on the table as feasibility is determined. Ms. Crumbaker mentioned preliminary calculations. She stated that it was premature to remove measures before the implementation and the justification for nonimplementation could be completed.

Ms. Crumbaker discussed the details of the memorandum from Maricopa County to MAG regarding the Suggested List of Measures. She indicated that Measure #11, notify violators more rapidly to promote immediate compliance, reflects the historical enforcement philosophy of Maricopa County of contacting whoever is on-site at the time of inspection. Ms. Crumbaker stated that Measure #12, provide timely notification regarding high pollution days, is a logistics challenge. She indicated that the State is the lead for the High Pollution Advisory day notification and forecasts.

Ms. Crumbaker mentioned Measure #31, pave or stabilize existing unpaved parking lots (e.g. upgrade to Phoenix Parking Code) - strengthen enforcement. She stated that many driveways do not accommodate the turning radius of large trucks causing the trucks to track dirt onto the paved street. Ms. Crumbaker stated that the County has concerns with Measure #32, pave and stabilize existing public dirt roads and alleys in terms of the number of miles that could be accomplished within the three year period given the fact that the County has to acquire the right-of-way before stabilizing or paving and dealing with drainage issues.

Ms. Crumbaker mentioned Measure #33, limit speeds to 15 miles per hour on high traffic dirt roads. She discussed traffic safety issues and stated that there is no enforcement on dirt roads. Maricopa County supports Measure #36, create a fund for paving and stabilizing in high pollution areas, except for the second bullet that directs fine monies to this fund. The Board of Supervisors reviews projects and appropriates the collected fine monies for specific projects as necessary to address various air quality projects. Ms. Crumbaker discussed Measure #38, restrict vehicle use and parking on vacant lots (e.g. Phoenix). She stated that the County will need statutory authorization to enact this type of ordinance.

Ms. Crumbaker stated that Maricopa County looked at successful measures being implemented in other areas. The County identified five measures that were eliminated prematurely in the plan development process: ability to assess liens on parcels to cover the costs of stabilizing them, just-in-time grading limitations for construction, reduce the tolerance of trackout to 25 feet before immediate clean up is required for construction sites (Maricopa County has already approved this standard for rock products facilities), no visible emissions at the property line (also already in effect for rock products facilities), and modeling cumulative impacts for permitted sources because of the

effects of multiple sources locating in close proximity to each other. She stated that the memorandum also emphasizes that the nonpermitted sources are big challenges and help from everyone is needed.

Dave Berry, Arizona Motor Transport Association, commented on previous discussion regarding the ability of the Committee to receive more information as it become available on the measures. He stated that the Committee recommended the Suggested List of Measures based on the information available at the time. Mr. Cleveland indicated that the Suggested List includes 41 measures and the Committee has been given direction by the MAG Regional Council to further review the measures included in the memorandum from Maricopa County. Mr. Berry stated that the measures should only be reevaluated to the extent new information becomes available.

Mr. Cleveland stated that since the MAG Regional Council took action on the Suggested List of Measures, each agency with authority to implement the suggested measures will be requested to make a legally binding commitment to implement the measures it deems appropriate or to submit a reasoned justification for nonimplementation. He mentioned the possibility of additional measures being added at the April meeting based on the memorandum. Ms. Bauer stated that since a Suggested List of Measures has been approved by the MAG Regional Council, MAG will prepare a model resolution package which will be sent out to the implementing agencies prior to the April meeting. Any measures recommended by the Committee in April would need to go to the MAG Management Committee and MAG Regional Council in May. Ms. Bauer stated that there may be measures that are not on the Suggested List that agencies commit to implement.

Amanda McGennis, Associated General Contractors, asked if the Committee could make a recommendation at the April meeting to make no changes to the Suggested List of Measures approved by the MAG Regional Council with the one modification and one addition. Ms. Bauer responded that is an option for the Committee. In that case, the recommendation would not need to be forwarded to the MAG Management Committee and MAG Regional Council since it was approved by the MAG Regional Council on March 28, 2007. Ms. McGennis inquired about taking action. Ms. Bauer stated that due to the open meeting law 24-hour notice, no action can be taken on the agenda item at this meeting. Mr. Cleveland stated that the Suggested List of Measures will be sent out to the implementing agencies. Any additional measures recommended in April will be forwarded separately. Mr. Gibbs commented on time constraints for the resolutions.

Mr. Bowers referred to the recommendation in the memorandum from Maricopa County on Measure #36. He inquired about the availability of a list of PM-10 projects that the County could offer under a supplemental environmental penalty program that would allow the violators to direct a portion of their fine to pay for a project without losing an additional percentage to administrative overhead. Ms. Crumbaker stated that the County believes the list needs to be developed. She indicated that the memorandum asks for help in developing a list of projects that reduce PM-10 that contractors may find attractive. Ms. Crumbaker stated that it would be the contractors option to participate in the supplemental environmental penalty program.

Mr. Bowers referred to a comment in the memorandum stating that Maricopa County is very concerned that calculations estimating emission reductions from the current measures on the list may be overly optimistic in the degree of implementation possible given the short timeframes we are striving to meet. He asked if Maricopa County has a different formula than MAG. Ms. Crumbaker stated that the concern of Maricopa County is that MAG used preliminary numbers to prepare the

basis. Maricopa County looked at the number of miles of unpaved roads. She stated that there must be a lot of miles in the cities to meet the goal. Ms. Crumbaker indicated that it is currently taking approximately three years to go through the process of acquiring the right-of-way, addressing the drainage issues, and applying the end product. She discussed the logistics.

Mr. Cleveland stated that there are three types of unpaved roads: Maricopa County, cities, and public roadways. He indicated that nobody has jurisdiction over the public roadways and the process to get jurisdiction over these roads takes nearly three years. Ms. Crumbaker stated that the Maricopa County network is made up of roads that have been open and declared. She noted that some of the unpaved roads do not have dedication to the public. Ms. Crumbaker mentioned the unpaved roads that have not been opened and declared by Maricopa County. In these cases the right-of-way and road itself would have to be acquired. She stated most of these roads are associated with lot splits. Mr. Bowers inquired about seeking lien authority for public common roads.

Mr. Cleveland requested that MAG provide the analysis for determining the number of miles of unpaved roads. Ms. Bauer stated that for unpaved roads, MAG first looked at what has been done in the past. In the 1999 Serious Area Plan for PM-10, collectively the cities committed to pave or stabilize 121 miles of unpaved roads. The County committed to 60 miles. She stated that MAG looked at the GIS database and found approximately 300 miles of unpaved roads between 50 and 150 average daily traffic (ADT). The assumption was that one-third of the unpaved roads would be stabilized and one-third would be paved.

Cathy Arthur, Maricopa Association of Governments, stated that the estimates are very preliminary. She discussed the difficulty of developing a distribution of unpaved roads by ADT. Since traffic counts were not available, MAG used the GIS database, aerial photography, and image recognition software to help identify dwelling units on unpaved roads. Ms. Arthur indicated that the data was manually checked to identify the unpaved roads that actually have traffic and the number of residential dwelling units. A Maricopa County Home Interview Survey determined that there are about nine vehicle trips per day from a residential unit. Ms. Arthur stated that all this information was used to develop a distribution of miles of unpaved roads by ADT. She indicated that there are approximately 300 miles of unpaved roads with 50 to 150 ADT. Ms. Arthur noted that Rule 310.01 already requires paving or stabilizing on unpaved roads with over 150 ADT. Ms. Arthur stated that this is a theoretical exercise; therefore, MAG has a contractor contacting many of the cities to collect any traffic counts and mileage estimates that have been prepared. She indicated that by the end of April there will be a better estimate as to the number of miles of unpaved public roads.

Ms. Arthur stated that there are also many miles of unpaved private roads. She mentioned that aerial photography does not discriminate between private and public unpaved roads. Therefore, the exercise looked at both, and the contractor will be looking only at public unpaved roads. She stated that MAG will need to integrate the two since the 2007 inventory needs to reflect both public and private unpaved roads. The assumption is that the private roads have much lower traffic levels. Ms. Arthur stated that the estimates provided will change as additional information becomes available. She added that the estimates are conservative.

Ms. Bauer stated that the commitments from the MAG member agencies are always impressive. She indicated that she has been asked how MAG knows that cities will commit to implement. She stated that the 1999 Serious Area Plan for PM-10 had four volumes of local government commitments.

Mr. Cleveland stated that the estimates and assumption indicate that 100 miles would be paved and 100 miles would be stabilized. He compared that to the 181 miles paved or stabilized in the 1999 Serious Area Plan for PM-10. Ms. Arthur mentioned the private roads that will not be governed by the new rules. Mr. Cleveland commented on the methodology. Ms. Arthur stated that the Indian Communities have many unpaved roads that carry high ADT. While they are not subject to the rules, they have voluntarily come forward and the 2007 MAG Transportation Improvement Program includes 15 miles of unpaved roads to be paved by the Fort McDowell Yavapai Nation with an ADT of 225. Ms. Arthur noted that the measure is to stabilize or pave unpaved roads and stabilization could occur much faster than three years. She indicated that a city may want to stabilize for the first two years and then pave in the third year; therefore, some benefit would be achieved in the first year.

Ms. Crumbaker stated that stabilization cannot occur until the right-of-way is acquired and the draining issues are addressed, which is a two year process. Ms. Arthur indicated that the cities have a lot of roads between 50 and 150 ADT. Mr. Cleveland asked if the unpaved roads in the County's jurisdiction could be stabilized faster than paving. Ms. Crumbaker responded that there is a two year process to acquire the right-of-way and address the draining issues. Mr. Cleveland asked if that would be the unpaved roads the County does not have jurisdiction over. Ms. Crumbaker replied that Maricopa County has not necessarily acquired the right-of-way to the open and declared unpaved roads. Mr. Cleveland commented on the County paving the roads they own.

Spencer Kamps, Homebuilders Association of Central Arizona, commented that stabilization is required on vacant lots and inquired about the difficulty with stabilizing unpaved roads. Ms. Crumbaker stated that the Maricopa County Department of Transportation listed their concerns in the memorandum. She indicated that a stabilizer changes the surface of the road and there are consequences. Mr. Kamps asked if it is a liability issue. Ms. Crumbaker responded that it is a traffic safety issue. She mentioned property rights, liability issues (traffic safety), and capital funding.

Mr. Berry expressed frustration that certain categories are highly regulated yet there are unpaved roads that are not addressed. He discussed possible solutions. Mr. Cleveland suggested forming a subcommittee to work with the Maricopa County Air Quality Department and Maricopa County Department of Transportation on the issue. Ms. Crumbaker commented that Maricopa County had approximately the same number of unpaved roads as paved roads in the 1980's. She mentioned the progress since then. Mr. Cleveland stated that part of the frustration is the creation of new unpaved roads. He inquired about the contribution of lot splits and wildcat subdivisions to the problem. Mr. Cleveland commented on having a paving requirement in the building permit.

Mr. Bowers mentioned a requirement to stabilize the access point to his property. Mr. Kamps indicated that the legislature has been discussing the issue. He agreed that a permit for a lot split should require some stabilization effort. Mr. Kamps stated that more private dirt roads are being created through lot splits. Mr. Cleveland mentioned refusing to issue a building permit for lot splits unless there is stabilization or paving. Mr. Kamps indicated that language could be added to State law to indicate stabilization or paving is a condition of a building permit. Mr. Cleveland commented on giving Maricopa County the authority necessary and discussed funding. Mr. Kamps stated that there is a bill going through the legislature that allows counties to institute improvement districts for road improvements, specifically to update roads. He indicated that dust suppression could be a component. Mr. Kamps mentioned that credit should be taken in the Five Percent Plan for PM-10.

Mr. Bowers inquired if the road improvements would be for annexation or air quality purposes. He mentioned cities pursuing improvement of property beyond air quality measures. Mr. Cleveland commented on working with the legislature to make sure the bill addresses air quality. Ms. Crumbaker stated that during the last housing boom, some developments went directly to multiple parcels in a single action and did not apply as a single subdivision. Mr. Cleveland mentioned the building permits. Ms. Crumbaker indicated that they have been forwarded to the Attorney General and Arizona Department of Real Estate; however, there has been no resolution. Mr. Cleveland commented on the legislature informing the executive branch. Mr. Kamps stated that the Arizona Department of Real Estate has done a good job on addressing illegal subdivisions. He indicated that there was a period where some people were aggressive in trying to avoid the law. Mr. Cleveland stated that the discussion has provided ideas for the subcommittee.

Mr. Bowers mentioned prior discussion by the Committee to not take anything off the table until more information is received. He indicated that a Suggested List of Measures was recommended and the Committee followed the process. Mr. Bowers discussed the recommendations by Maricopa County in the memorandum and stated that the Committee has reviewed the measures and made a decision based on the information available. He commented on the ability of the MAG Regional Council to take action different than that recommended by the Committee. Mr. Cleveland stated that action on this item will occur at the April meeting.

Mr. Kamps referred to the comments from Maricopa County on Measure #11. Ms. Crumbaker indicated that it is standard procedure for an inspector to stop and talk to someone on-site and inform them that something needs to be done when the inspection is the result of a proactive inspection, a complaint-based inspection, or an occasional stop when they drive by the site. If nobody is on-site, the inspector places a telephone call. In that case, the inspection report follows by mail. Mr. Kamps asked if those on-site are allowed to walk with the inspector throughout the project. Ms. Crumbaker replied that the inspector attempts to find a responsible party on-site to accompany the inspector. She indicated that there is sometimes a reluctance to sign inspection rights and participate.

Mr. Kamps stated that he has been denied the opportunity to accompany the inspector. Ms. Crumbaker indicated that she would not discuss current litigation. She mentioned that those on-site can accompany the inspector. Mr. Kamps stated this is not part of litigation. He indicated that Maricopa County has not typically provided the Notices of Violation (NOVs) immediately. Ms. Crumbaker replied that NOVs are separate from informing the site that there is a violation that has to be corrected. The NOVs are issued after the report is written and it is reviewed by a supervisor. She stated that the first notification is verbally. If it is by telephone, it is noted on the inspection report left on-site.

Mr. Kamps indicated that based on current policy, a site could continue to operate in violation of Rule 310 for days before the NOV is received. Mr. Bowers indicated that Measure #11 would provide a benefit by notifying violators more rapidly to promote immediate compliance.

Diane Arnst, Arizona Department of Environmental Quality, asked if the Draft Sierra Research Analysis of Particulate Control Measure Cost Effectiveness and the Draft Maricopa County 2005 Periodic Emissions Inventory for PM-10 would be finalized before the April meeting. She suggested that the actions taken by the Committee are still preliminary, if these items are not final.

Ms. Arthur stated that the Draft Sierra Research Analysis of Particulate Control Measure Cost Effectiveness will be finalized by the April meeting and will be almost identical to the draft. She

noted that the report only addresses the first 46 measures. Mr. Cleveland asked if the Suggested List of Measures approved by the MAG Regional Council are included in the report. Ms. Arthur replied that the measures received late in the process were not included in the report. Ms. Arnst asked if the report is being revised based on comments received. Ms. Arthur stated that the consultant is working to respond to the comments received at the meetings on the first 46 measures.

Ms. Crumbaker discussed the timeline for the Draft Maricopa County 2005 Periodic Emissions Inventory for PM-10. She stated that there are still some refinements to the windblown model. Ms. Crumbaker asked about updates to the mobile source section. Ms. Arthur stated that the intent was to not update the mobile source section of the inventory with the new SCAMPER values, since the MAG Silt Loading Study was conducted in 2006. She indicated that the new values will be in the base for 2007. Therefore, the paved road PM-10 emissions data is complete for 2005. Ms. Crumbaker stated that with a target date of mid April, the Maricopa County 2005 Periodic Emissions Inventory for PM-10 should be finalized by the April meeting.

Mr. Gibbs commented on a recommendation by Maricopa County in the memorandum to rewrite Measures #4 and #37 to include city codes and ordinances as well as County Rule 310.01 and to add cities as implementing agencies to those measures. Ms. Crumbaker discussed the Salt River Area and stated that nonpermitted sources are consuming a significant amount of time. She mentioned that issues such as unpaved parking lots and unpaved roads have connections to building permits and would involve city building staff. Ms. Crumbaker stated that the message of the County is that the number of nonpermitted sources is more than a single agency can handle. She indicated that everyone needs to help and mentioned initiatives.

Mr. Gibbs asked if the County is envisioning cities adopting Rule 310.01. Ms. Crumbaker replied that cities would do what they can within their general governmental authority. She noted that air pollution is often a result of other problems such as trespassing. Mr. Gibbs discussed the difference between enforcing codes where there is an actual current manifestation of a vehicle versus no vehicle and just tire tracks. He noted that many cities have codes for parking on unpaved areas. Ms. Crumbaker stated that there are more vacant lots than Maricopa County can handle and mentioned enforcement issues. She indicated that it takes more than a single agency to make substantial achievements in a three year time period. Mr. Gibbs stated that he agreed; however, it would be problematic for cities to enforce Rule 310.01. Ms. Crumbaker indicated that cities need to develop their own way to deal with the problem.

Ms. McGennis stated that the Maricopa County memorandum recommended that the just-in-time grading measure be added to the Suggested List of Measures which was voted down by the Committee. She indicated that just-in-time grading is impractical and distributed material. Ms. McGennis stated that the number one issue is that the same dirt would be moved more than once.

Mr. Bowers asked how the Committee sees the work being conducted. He inquired if work should be suspended until the Draft Sierra Research Analysis of Particulate Control Measure Cost Effectiveness and the Draft Maricopa County 2005 Periodic Emissions Inventory for PM-10 are finalized. Mr. Bowers discussed the timeline and asked if the work being conducted is tentative. He suggested waiting until the work is no longer tentative. Ms. Bauer stated that the MAG Regional Council is the decision making body at MAG and have approved the Suggested List of Measures to reduce PM-10 Particulate Matter with one modification and one addition. She indicated that the model resolution package will now be sent out to the implementing agencies.

Mr. Hyde expressed disappointment with the “can’t do” attitude in the Maricopa County memorandum. He indicated that paving dirt roads and placing speed limits on dirt roads are two of the five categories with the most potential for PM-10 reduction. He stated that the two measures total 5,900 tons.

Mr. Cleveland noted that this item is for information and discussion. He indicated that there will be an opportunity at the April meeting for the Committee to consider the measures addressed in the Maricopa County memorandum.

8. MAG Silt Loading Study

Ms. Arthur introduced Dennis Fitz, College of Engineering, Center for Environmental Research and Technology, University of California, Riverside (CE-CERT). She discussed his experience and indicated that MAG contracted with CE-CERT for the MAG Silt Loading Study to improve estimates of particulate emissions from paved roads in the Maricopa County PM-10 nonattainment area. Ms. Arthur indicated that the draft final report has been received, and the data will be utilized in the Five Percent Plan for PM-10 for the 2007 emission estimates. She stated that Clark County (Las Vegas, Nevada) is requesting from EPA official permission to use this approach in lieu of AP-42. Ms. Arthur discussed the legitimacy of the approach and indicated that the process will be documented in the Technical Support Document of the Five Percent Plan for PM-10.

Mr. Fitz discussed the purpose of the study. He stated that emissions were being measured directly with the new device. Mr. Fitz indicated that quantifying PM emissions from paved roads is important because: they are a significant contributor to exceeding standards, estimated inventories of geologic PM are higher than measured concentrations, and AP-42 estimation of emissions due to paved roads are a major component of geologic emissions. He mentioned that emission inventories are difficult to determine because: the fugitive nature leads to high uncertainties for emission factors, current inventories are based on an empirical equation derived from upwind-downwind sampling from primarily industrial roads, modeling is required to determine emission factors from upwind-downwind concentrations, and PM concentration differences are small between upwind and downwind locations for most roads.

Mr. Fitz provided a review of the two methods: AP-42 and System for Continuous Aerosol Measurement of Particulate Emissions from Roadways (SCAMPER) Mobile Approach. He discussed the AP-42 paved road emission equation, which is based on an upwind-downwind filter sampling of PM with monitoring towers. Mr. Fitz indicated that the emission rate is calculated from mass balance and regressed with physical parameters.

Mr. Fitz discussed the SCAMPER approach. He mentioned that this method measures PM directly in front and behind a test vehicle with an isokinetic sampling probe, uses real-time sensors to quickly accumulate large amounts of PM data, determines emission factors based on the concentration within the vehicle’s wake, determines location by GPS, and there is a PC to log all data at one second intervals. He discussed the isokinetic sampling probe which makes particle measurements accurate on a moving vehicle. Mr. Fitz discussed the SCAMPER emission factor calculation which includes a calibration factor to relate DustTrak response to filter-based PM-10 mass measurement.

Mr. Fitz discussed the literature search. He referred to pre-AP-42 and mentioned the Nicholson review 1988. He indicated that there were no citations of research leading to AP-42 and discussed tagged fluorescent dye studies. Mr. Fitz mentioned various upwind-downwind studies conducted

in the 1990's which were limited by the small differences between upwind and downwind concentrations. He indicated that modeling methods included dispersion and receptor modeling. He mentioned that modeling results have unknown uncertainties.

Mr. Fitz discussed the SCAMPER approach for Maricopa County. He provided a map of the test route and mentioned that it took approximately six to seven hours to complete. He discussed the variety of roads on the test route and pointed out the quality control loops. Mr. Fitz indicated that there were test days in March, June, September, and December 2006 for a total of 18 test days. He mentioned the quality control which included routine DustTrak zero and flow rate test, short test loops to determine precision, collocated DustTraks, and PM-10 filtration collection using the EPA approved inlet.

Mr. Fitz discussed the data validation for the SCAMPER approach in Maricopa County. To remove spurious DustTrak data, the data was reported as the five second running average of a five second running median. In addition, all questionable data was flagged and when GPS signals were not received, the data was averaged for the missing one second interval. He noted that for reporting emission rates, only good data were used that were above 10 miles per hour. Mr. Fitz indicated that GPS coordinates were used to determine average emission rates for 69 road segments.

Mr. Fitz discussed the results from the quality control loops. He noted that PM-2.5 was measured in March 2006 and there was a very high relative standard deviation and very low reproducibility due to the low concentrations. As a result, PM-2.5 was not measured during the remaining test days. Mr. Fitz presented the comparison of PM-10 concentrations of rear-mounted DustTraks on June 19, 2006. He provided the data summary for March 2006 and indicated that the average emission rate was 0.094 mg/m and the relative standard deviation was 21 percent. Mr. Fitz noted that there was a drop in emission rates observed on Saturday (last day of sampling). He presented the PM-10 emission rate by road segment and indicated that the mobile system was able to determine the hot spots.

Mr. Fitz indicated that in June 2006, the average emission rate was 0.125 mg/m and the relative standard deviation was 22 percent. He provided the PM-10 emission rate by road segment and noted that the same locations were producing high concentrations. Mr. Fitz stated that in September 2006, the average emission rate was 0.068 mg/m and the relative standard deviation was 28 percent. He indicated that there was a significant weekend effect observed. Mr. Fitz provided the PM-10 emission rate by road segment and paved road weekend-weekday effect. He noted that there are very little emissions on Sunday and significant increase on Monday. Therefore, the reservoir on the road that causes the emissions does not last long and is easily replaced. Mr. Fitz indicated that in December 2006, the average emission rate was 0.087 mg/m and Sunday was an anomaly due to high winds. He provided the PM-10 emission rate by road segment and mentioned that there was some differences.

Mr. Fitz discussed the estimation of the DustTrak Correction Factor. He indicated that EPA has regulations that are mass based, not optical sensor based. Mr. Fitz discussed the linear regression of filter based and DustTrak PM-10 concentrations. He noted that the filters were 4.0 and 3.3 times higher in March and June, respectively, and there was no regression since the filters had about the same amount of loading. In September, the filter was 3.8 times higher and the linear regression had a slope of 3.3. Mr. Fitz indicated that a regression was not done in December and the filter was 2.8 times higher. Overall, the filters (approximately 40 samples) were 3.6 times higher than the

DustTrak concentration. He mentioned that there was a regression with a slope of 3.4 and provided the comparison of all filter and DustTrak PM-10 concentrations. He mentioned that the scatter is likely due to changing optical properties of the dust being sampled in the back of the vehicle. He noted the correlation and stated that the DustTrak is reading less than the filter collection.

Mr. Fitz discussed the EPA acceptance testing. He indicated that Clark County is in phase four of their study. Mr. Fitz stated that they are working with Desert Research Institute (DRI) who has a similar vehicle that measures PM-10 concentrations in the wheel well and in the front of the vehicle and calibration is required. He indicated that this is the first time everything has been done at one location in a controlled environment. Mr. Fitz mentioned that the results will be presented at the EPA Emission Inventory Conference in May 2007. He indicated that he has been working with EPA and the goal is to have EPA accept mobile methods as a preferred alternative to AP-42.

Mr. Fitz discussed the highlights of the study. He indicated that small fractions of roadways are responsible for most of the PM-10 emissions, monitoring of PM-2.5 emission rates is not practical for roads with low PM emission rates, and there are significantly lower weekend emission rates. Mr. Fitz added that no significant seasonal variability was observed, the SCAMPER method has a precision of approximately 25 percent, and although there is considerable scatter in the comparisons, a factor of 3.4 is recommended to compare DustTrak emission rates with filter based methods. He indicated that the advantages of SCAMPER are low cost, no upwind-downwind calibration required, DustTrak (light scattering sensor) calibrated to PM-10 mass measurement during sampling, ability to easily collect large amounts of data, and ability to easily determine PM hot spots.

Mr. Fitz indicated that the SCAMPER results would help with emission inventory compilation which includes the weekend effect. He mentioned focusing on minimizing deposits on roadways for mitigation rather than removing silt and stated that PM-10 emission rates equilibrate rapidly. He also recommended a SCAMPER "light" for enforcement and evaluation of mitigation methods.

Mr. Bowers commented on AP-42 using samples from industrial roads. Mr. Fitz stated that AP-42 was developed primarily by measuring on industrial roads since they had a high enough differential between upwind and downwind. Mr. Bowers asked if the results would have been more conservative using AP-42 versus the SCAMPER approach. He indicated that the typical freeway does not have the silt loading of industrial roads and asked if applying AP-42 to a freeway would result in more conservative numbers. Mr. Fitz replied that the silt loading is lower and the estimated rate would be lower.

Mr. Bowers asked if this methodology is not effective for PM-2.5. Mr. Fitz responded that is correct since the concentration sensitivity is not high enough. He indicated that the methodology does work in areas producing high emissions. Mr. Bowers commented on the excavation at the Pueblo Grande Museum and Archaeological Park. He mentioned dust settling quickly on the roads during dust events. Mr. Fitz stated that large particles settle out very quickly. Mr. Bowers inquired about a correlation between dust events and associated high PM concentrations on the following days as the dust is reentrained. Mr. Fitz replied that a dust event could affect an area for a few days. Mr. Bowers inquired about a peer review of the SCAMPER approach. Mr. Fitz responded that they are working with Clark County and the DRI to put together a package for peer review and publication. Mr. Bowers commented that the method is exciting since we will be able to determine if something is working very quickly.

Mr. Cleveland inquired about a statement made on the effect of street sweepers. Mr. Fitz replied that in some conditions sweepers can increase the emission rates. However, if there is a lot of material on the road, it is better to get it off before it is reentrained by vehicles.

Mr. Hyde inquired about how the results would compare to silt loadings. Ms. Arthur responded that the study has resulted in emission rates that will be applied to the inventory. She indicated that she has recently learned about the calibration factor and up until this point, 2.2 has been used. Ms. Arthur stated that 3.4 will make a big difference and it will likely increase the paved road emissions share of the inventory. Mr. Hyde asked about the dirtiest roads on the test route. Ms. Arthur replied that the areas with the highest concentrations were Higley and the Salt River Area. Mr. Fitz indicated that he did not expect the Clark County Study to agree well with AP-42. However, there was a good comparison on the test segment.

Ms. Arthur requested that Mr. Fitz describe the experiment with street sweepers from which he derived the conclusion that they are increasing the emission rates. She indicated that it is important to note that it was a controlled experiment and the roads were clean at the beginning. Mr. Fitz stated that he did not start the Clark County Phase IV Study with any intention of looking at the performance of street sweepers. In the study, a very clean road was closed and monitoring began before the study started. Mr. Fitz indicated that the first thing was to sweep the clean road. After the road was swept, there were higher emissions. He emphasized that he was not studying how well sweepers work.

Mr. Berry commented on leaving the dust to build up on the road versus sweeping to limit reentrainment. Mr. Fitz stated that the dust does not build up on roads because it is reentrained into the air by vehicles. He referred to a test in Clark County. Mr. Fitz stated that the equilibrium was reached by the 15th pass, depending upon the amount of material placed on the road. Mr. Berry asked if equilibrium will be reached regardless if the roads are swept. Mr. Fitz replied that equilibrium will be reached quickly with vehicles driving on the road. Mr. Berry asked if the material is suspended in the air or deposited somewhere else to reach equilibrium. Mr. Fitz responded that the material is likely being deposited somewhere off the road.

Mr. Berry asked for advice on using street sweepers to remove dust. Mr. Fitz replied that he does not have enough information on street sweepers and he has not addressed their efficiency. He indicated that based on observation, it is better to have the material on the road removed by a sweeper than by a vehicle. A sweeper collects the material whereas a vehicle would reentrain it. Mr. Berry indicated that Swift Transportation is looking at what happens to the air around their trucks. He discussed the turbulence that causes dust to become suspended and the negative pressure behind the trailers. Mr. Berry mentioned changes that can reduce the turbulence. He stated that there is a fuel and possibly a reentrainment benefit. Mr. Fitz stated that it would likely have a benefit and referred to a DRI study on large vehicles that would pick up materials from unpaved shoulders. He noted that the road traveled makes a difference. Mr. Berry indicated that the Department of Energy has sponsored the research for saving fuel; however, there may be a reentrainment benefit.

9. Ozone Control Measures

Mr. Hyde discussed additional potential ozone control measures. He indicated that the region is still nonattainment for the eight-hour ozone standard. For the last two years, there have been values of 84 and 83 parts per billion (ppb), respectively. He noted that a value of 85 ppb would be a violation. Mr. Hyde indicated that EPA will likely propose a more stringent ozone standard of 70 ppb, which

would result in only four of the 35 ozone monitoring stations operating in 2005 being in compliance. With a more stringent standard on the verge of being proposed, ADEQ is suggesting that the Committee recommend three ozone control measures: ban on open burning during the ozone season, expand Area A, and liquid leaker test. He indicated that the measures have benefits of reducing volatile organic compounds and nitrogen oxides.

Mr. Bowers discussed ozone formation and higher readings in the East Valley. He asked if the measures could be more specific in prohibition. Mr. Bowers stated that at certain times of the day, an open burn would not be contributing to ozone formation. Mr. Hyde commented on conducting open burning when ventilation is best. He acknowledged that some locations would contribute more to high ozone concentrations than others.

Brian O'Donnell, Southwest Gas Corporation, inquired about expanding Area A. Mr. Hyde stated that ADEQ is proposing to increase Area A which would expand the Vehicle Inspection and Maintenance Program, Stage II Vapor Recovery, and cleaner burning gasoline. Mr. O'Donnell commented that expanding Area A would also result in new emission limits on industry. He discussed the long negotiations that occurred the last time Area A was expanded. Mr. Hyde mentioned the air pollution permit process. He provided background information on Area A and inquired about additional industrial controls applying to Area A. Ms. Crumbaker replied that for major source New Source Review purposes, the scope is the nonattainment area.

Mr. O'Donnell commented on lowering the emission standards for industry to move into new locations. He indicated that the Committee needs to be clear on the impacts of expanding Area A. Mr. Hyde stated that expanding Area A would require vehicles to be inspected and maintained, the use of Stage II Vapor Recovery equipment at retail gas stations, and the use of cleaner burning gasoline. He indicated that the expansion area is to the west of the existing Area A boundary. According to general plans, the expanded area is going to be mostly occupied.

Ms. Bauer referred to the Strawman Area A Expansion map provided by ADEQ and asked if the expanded Area A would have the same measures included in the existing Area A boundary. She noted that Mr. Hyde only mentioned three measures being applied to the expanded area. Mr. Hyde mentioned concerns raised by Pinal County. He indicated that he does not have the details and it may depend on the timing. Ms. Bauer inquired about the equitability of the proposed measure to expand Area A which would have only the three measures mentioned applying to the expanded area west of the existing boundary and the existing Area A would continue to have all the current measures associated with it.

Mr. Cleveland inquired about the difference between the map provided in the agenda packet and the one distributed to the Committee. Mr. Hyde replied that the Strawman Area A Expansion map provided to the Committee is the most current proposal. Ms. Arnst indicated that the Strawman Area A Expansion map provided to the Committee is only the western expansion of the proposal included in the agenda packet. Mr. Hyde stated that the measure would expand Area A 12 miles to the west and 12 miles in the northwest corner. Ms. Arnst indicated that ADEQ is suggesting that the three measures proposed for the expanded Area A appear to be very effective at reducing ozone. She stated that it would be up to the Committee to recommend any other existing Area A measures be applied to the expanded area. Ms. Arnst indicated that the measure could be a contingency measure since the values are so close. She mentioned that the EPA General Preamble and Addendum for the

Eight-Hour Ozone Standard indicates that unless a region is below the actual standard, EPA will not redesignate the region. Ms. Arnst stated that the design value would need to be 80 ppb.

Vic Dugan, Exxon Mobil, referred to the Strawman Areas A and B Expansion and Arizona Land Ownership map included in the agenda packet. He requested clarification that the proposed Area A expansion measure no longer refers to the southeast expansion and just the area to the west. Ms. Arnst responded that in reference to the comments by Pinal County and the jurisdiction of the Committee, only the western expansion is being proposed.

Mr. Berry inquired about applying all the control measures in the existing Area A boundary to the expanded Area A. Ms. Arnst replied that it would be up to the Committee to decide which measures would be applied to the expanded area. She stated that if the purpose is to focus on ozone controls, the Vehicle Inspection and Maintenance Program, Stage II Vapor Recovery, and cleaner burning gasoline would be applied.

Mr. Berry mentioned discussion of control measures at the legislature. He indicated that people were nervous about expanding Area A because of the possibility of unintended consequences. Mr. Berry stated that there was agreement that some of the measures were good common sense and should be applied without expanding Area A. He asked if the ADEQ proposal before the Committee is the same as that proposed by ADEQ at the legislature. Mr. Bowers stated that there is a difference between the proposals. He indicated that the discussion at the legislature included the southeast portion of the expanded Area A and the point was to authorize the county without changing the Area A boundary. Mr. Berry commented on trying to avoid any unintended consequences of changing the Area A boundary.

Ms. Fish asked what is occurring in the proposed expanded area to the west of the existing Area A that is a concern. She asked if congestion, power plants, and power generation plants are being targeted. Mr. Hyde responded that the proposal would expand cleaner burning gasoline, a liquid leaker test, Vehicle Inspection and Maintenance Program, and ban on open burning during the ozone season. At the present time, there is not a large amount of hydrocarbons and nitrogen oxide emissions from the expanded area. He noted that there will be more benefit in the future.

Mr. Hyde inquired about existing measures applicable to the current Area A boundary being automatically expanded to the larger Area A boundary. Ms. Arnst commented on drafting language to limit the measures applied to the expanded area. Ms. Fish inquired about the expanded area. Ms. Arnst mentioned the homes planned in the expanded area and the associated trips.

Mr. Hajduk indicated that he would like a better understanding of the possible action for this agenda item. Mr. Berry moved that action on potential ozone control measures be tabled until the next meeting. Ms. Fish seconded and the motion passed unanimously.

10. Call for Future Agenda Items

Mr. Cleveland announced that the next meeting of the Committee is tentatively scheduled for April 26, 2007 at 1:30 p.m. With no further comments, the meeting was adjourned.

MEMORANDUM

To: Dennis Smith, Executive Director
Maricopa Association of Governments

From: Don Stapley, Supervisor District 2
Maricopa County

Date: March 28, 2007

Subject: MAG's Suggested List of Measures to Reduce PM-10 Particulate Matter

Introduction:

The Clean Air Act requirement to prepare a Five Percent Per Year Reduction Plan presents significant challenges to all of us. Many measures on this suggested list will provide PM-10 emission reductions that can be summed for the Five Percent Plan. However, Maricopa County has identified a number of issues with MAG's Suggested List that concern us.

First, one suggested measure is not a control measure but a direction to the County on how to conduct an enforcement program courtesy of industry. This measure's description reflects long-standing air compliance program standard operating procedures and therefore would not provide emission reductions. Second, another measure raises traffic safety issues, is not and will not be of sufficient concern to receive law enforcement priority and, as a result, will not achieve the emission reductions desired. Third, Maricopa County would like to go on record to express concern over a number of successful measures in place in Clark County, Nevada, and California air districts that were not included on the suggested list of measures. Finally, non-permitted emissions sources such as unpaved parking, unpaved staging areas, unpaved roads, vacant lots and open areas are so numerous and the process to address remedies consumes so much time that the County alone can not address these problems. Additional programs implemented by cities as well as the County will be necessary to reach the goal for the Five Percent Plan.

Comments on Specific Measures on the Suggested List:**Measure #11** Notify violators more rapidly to promote immediate compliance.

This statement reflects the County's historical enforcement philosophy and standard operating procedure.

Recommendation: Delete measure #11 as Maricopa County Air Quality Department's Standard Operating Procedure already directs inspectors to contact whoever is working onsite at the time of inspection or contact the designated representative if no one is present on site.

Measure #12 Provide timely notification regarding high pollution days.

Notifying non-permitted sources presents logistical challenges. Do any cities or towns have systems for rapid communication with businesses? As a side note, this measure should identify the State as the primary responsible party for implementation as the Arizona Department of

Environmental Quality (ADEQ) issues the forecast and high pollution advisory. The County and Valley Metro assist the ADEQ in disseminating the notices.

Measure #31 Pave or stabilize existing unpaved parking lots (e.g. upgrade to Phoenix Parking Code) – strengthen enforcement.

Please note Maricopa County personnel have observed that many driveways currently do not accommodate the turning radius of large trucks. As a result the trucks track dirt onto the paved street. Code specifications should be designed and sized to avoid truck movement on and off paved surfaces.

Measure #32 Pave or stabilize existing public dirt roads and alleys.

Just a word of caution, both the acquisition of capital funding and the timeframes involved in road improvement projects present significant challenges to implementing this measure and obtaining emission reductions in a relatively short timeframe. Both stabilization and paving meet the criteria defining road improvements. Improvements that limit dust triggers traffic safety and property rights issues. Through experience in paving unpaved roads over the years, the County has identified the following factors that impact the implementation of projects to pave or stabilize existing public dirt roads and alleys:

- Stabilizing or paving the surface makes for a smooth road, and traffic speeds and design speeds must be evaluated, as many dirt roads do not have adequate sight distance nor curve radius for increased speeds.
- Improvements that cut dust also limit the permeability of the surface, affecting runoff volumes and velocity.
- Utility re-location and drainage issues must be considered and funded.
- Many publicly maintained roads are not wholly owned, so rights-of-way must be purchased before improvements can start. That is a two year process.

County Concern: Currently programmed projects are taking approximately three years to complete. Maricopa County spent in excess of \$23 million over 4 years for support of paving 65 miles of dirt roads committed to under the Serious Area PM-10 plan, and continues to commit \$3 million per year to paving of dirt roads. Given the long time frames needed to construct individual roads, only a limited number will have an impact within the timeframe of this Five Percent plan. County believes that the preliminary emission reduction calculations from this measure are too optimistic.

Measure #33 Limit speeds to 15 miles per hour on high traffic dirt roads.

The County believes this measure will result in paper reductions. Currently the County has a uniform policy for not posting a speed limit on any unpaved roadway. In essence a posted speed limit suggests to the public that the posted speed will always be safe. MCDOT has concluded from past experiences that the constant changing conditions of an unpaved surface, such as: heavy rains/flooded roadway, infrequent maintenance/road grading makes a proper and realistic speed limit posting near impossible. This follows the basic practices of the Arizona Department of Transportation, who also will not install speed limit signage for the same reason. The County Attorney has given the advice that posting of speed limits on dirt roads is unwise and should not be done. This conclusion is further reinforced by the absence of enforcement officers that would be needed to assure compliance with posted speed limits. In conclusion, the State law sets basic

speed limits, and the basic standard of reasonable and prudent speed. With over 2800 miles of roadway under County jurisdiction, an unreasonable speed limit for dirt roads would be unenforceable and would foster disregard for existing speed limits on paved roads.

Recommendation: Remove measure #33 from the list as is it not practically enforceable, interferes with traffic safety standards, and will not actually reduce emissions.

Measure #36 Create a fund for paving and stabilizing in high pollution areas.

Maricopa County supports this measure except for the second bullet that directs fine monies to this fund. The Board reviews projects and appropriates the collected fine monies for specific projects as necessary to address various air quality priorities. At a minimum, fine monies should cover the cost of escalating the enforcement for the violators and recover the economic benefit derived from non-compliance. Escalated enforcement costs are not included in standard permit fees. Through the budget process, the Board sets the air enforcement division budget and approves one-time only expenditures from the accumulated funds to cover projects such as the Bring Back Blue public outreach campaign, a mobile monitoring van and a particulate study in the Agua Fria River bottom. As a further point, construction violations constituted approximately 55% of all fines the Air Quality Department collected in calendar year 2006. PM-10 is not the only air quality problem the County must address.

Recommendation: Strike the second bullet under the measure description. Instead of directing the fines into still another fund that would require an additional administrative overhead expense, your help would be appreciated in developing a list of PM-10 projects that the County can offer under a supplemental environmental penalty program would allow the violators to direct a portion of their fine to pay for a project without losing an additional percentage to administrative overhead.

Measure #38 Restrict vehicle use and parking on vacant lots (e.g. Phoenix).

The County will need statutory authorization to enact this type of ordinance.

Recommendation: Add the State to the list of implementing authorities.

Measures Not On Suggested List:

A number of measures that Clark County and/or California air districts adopted as part of their successful programs to attain the standards did not survive the committee process. We believe it is premature to eliminate measures that were successful elsewhere so early in this plan development process. Furthermore, Maricopa County is very concerned that calculations estimating emission reductions from the current measures on the list may be overly optimistic in the degree of implementation possible given the short timeframes we are striving to meet. We believe the following measures can provide additional PM-10 reductions and should be placed back on the list.

Recommendation: Maricopa County has identified the following list of measures and move that they be added to the suggested measure list under consideration today:

1. Ability to assess liens on parcels to cover the costs of stabilizing them.
2. Just-in-time grading limitations for construction.

3. Reduce the tolerance of trackout to 25 feet before immediate clean up is required for construction sites. Maricopa County has already approved this standard for rock products facilities.
4. No visible emissions at the property line (also already in effect for rock products facilities)
5. Modeling cumulative impacts for permitted sources because of the effects of multiple sources locating in close proximity to each other.

Your backing and support through recommendation of these measures would be appreciated.

Non-Permitted Sources:

Non-permitted emissions sources such as unpaved parking, unpaved staging areas, unpaved roads, vacant lots and open areas are so numerous and the process to address remedies consumes so much time that the County alone can not address these problems. Additional programs implemented by cities as well as the County will be necessary to reach the goal for the Five Percent Plan. The County recognizes that several cities have stepped up and tackled a number of these emission sources, however, all cities need to join in this effort to control a widespread problem.

These categories of sources are not part of traditional air quality programs since the dust from them is released by incidental activities and not the primary business function. Modern building codes no longer allow new unpaved surfaces in developed areas, but the older grandfathered surfaces are still out there. The dust released from the remaining categories of sources such as vacant lots and open areas arises from vehicular activity (trespass) and illegal dumping. The dust is incidental to trespass and illegal dumping activities that fall under general governmental authorities.

How can we get our arms around this problem? The number of unpaved parking lots, unpaved staging areas and unpaved roads vary by jurisdictions and with the age of development. However, all jurisdictions contain vacant lots or expanses of open areas. The Assessor's database indicates that there are over 100,000 undeveloped parcels in the PM-10 nonattainment area. To illustrate further, the County is already encountering the need to re-inspect vacant lots because of rain prior to the initial inspection or the activities by parcel owners to abate weeds since the last inspection.

All of us face constraints in resources. To achieve the emission reductions for the Five Percent Plan, everyone will have to step forward to mitigate PM-10 emissions from all non-permitted sources. EPA recognizes that an appropriate implementation strategy includes a proactive inspection program based on identified priorities, maintains traditional complaint response capabilities, and accomplishes this with specified resources. We would suggest that a similar strategy to identify a small proactive initiative team while still responding to complaints will work for cities and towns as well. Based on our experience, we suspect that many of these non-traditional sources may be associated with or contribute to the dusty roads that your public works departments identified in earlier PM-10 plans for targeted street sweeping and unpaved shoulder attention.

Recommendation: The County recommends measures #4 and #37 be re-written to include city codes and ordinances as well as County Rule 310.01 and to add cities as implementing agencies to those measures.

Revised to reflect MAG Regional Council approval on March 28, 2007

PRELIMINARY ESTIMATES OF PM-10 EMISSION REDUCTIONS FOR THE SUGGESTED LIST OF MEASURES TO REDUCE PM-10 PARTICULATE MATTER

(These preliminary estimates are based on the Draft Maricopa County 2005 Periodic Emissions Inventory for PM-10, January 23, 2007. The emission reductions in the Five Percent Plan for PM-10 will reflect revisions to the 2005 Inventory, updated projections for 2007, and commitments to implement the measures.)

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
Fugitive Dust Control Rules		
1. Public education and outreach (e.g., Clark County) with assistance from local governments - This measure would involve publicity campaigns (e.g., Bring Back Blue) that increase public awareness of the PM-10 problem and discourage citizens from participating in activities that generate airborne dust.	County, local governments	91 (0.1% decrease in total PM-10 emissions)
2. Extensive Dust Control Training Program (e.g., Clark County) - This measure would involve conducting more frequent dust control training classes and implementing a formal certification program. The County would provide advanced training to representatives of trade associations to qualify them to conduct classes and issue certifications. The County video on dust control rules and practices will be updated and distributed to public agencies and private companies for use in training their employees.	County, private sector	1,128 (3% increase in compliance with Rule 310)
3. Dust Managers required at construction sites of 50 acres and greater (e.g., Clark County) - This measure would require a dust manager to be present on construction sites where 50 or more acres of soil are disturbed.	County	376 (1% increase in compliance with Rule 310)
4. Dedicated enforcement coordinator for unpaved roads, unpaved parking, and vacant lots (e.g., Clark County) - This measure would require that additional resources be dedicated to strengthen enforcement of Rule 310.01 for unpaved roads, unpaved parking lots, and vacant disturbed lots.	County	94 (1% increase in compliance with Rule 310.01)
5. Establish a certification program for Dust Free Developments to serve as an industry standard - This measure would create a program to certify and publicize companies that routinely demonstrate exceptional efforts to reduce airborne dust.	State, County	38 (0.1% increase in compliance with Rule 310)

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
6. Better defined tarping requirements in Rule 310 to include enclosure of the bed - This measure would modify Rule 310 to require that the cargo compartments of trucks whether loaded or empty be fully enclosed prior to traveling on paved public roads.	County	38 (0.1% increase in compliance with Rule 310)
7. Conduct mobile monitoring to measure PM-10 and issue NOVs - This measure involves deployment of a vehicle that has been instrumented to monitor PM-10 and meteorological conditions, so that sources can be identified, and immediate remediation and/or enforcement actions taken.	County	9 (0.1% increase in compliance with Rule 310.01)
8. Conduct nighttime and weekend inspections - This measure would involve proactive inspections of nonpermitted and permitted PM-10 sources during non-daylight hours and on weekends.	County	1,503 (3% increase in compliance with Rules 310, 310.01 and 316)
9. Increase inspection frequency for permitted facilities - This measure would increase the number of proactive inspections conducted at permitted facilities.	County	31 (1% increase in compliance with Rule 316)
10. Increase number of proactive inspections in areas of highest PM-10 emissions densities <ul style="list-style-type: none"> - intensify training and education - incentive program for compliance - This measure would focus on the areas of highest PM-10 emissions density by increasing the number of inspectors and proactive inspections, conducting on-site training, offering incentives to reduce PM-10, and performing community outreach.	County	51 (5% increase in compliance with Rules 310 and 316 applied to 2.5% of the PM-10 emissions)
11. Notify violators more rapidly to promote immediate compliance - This measure would require inspectors that observe visible dust (e.g., opacity or trackout levels that are approaching rule limits) to call the permit holder and make reasonable efforts to inform a person on-site, so that measures can be taken to prevent, reduce, or mitigate dust generation before a violation occurs.	County	376 (1% decrease in construction emissions)

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
12. Provide timely notification regarding high pollution days - This measure would provide timely notification to permitted and nonpermitted sources when a High Pollution Advisory or High Pollution Watch is issued by ADEQ.	County	69 (1% increase in compliance with Rules 310, 310.01, and 316 adjusted by the % of high pollution days (50)per yr)
13. Develop a program for subcontractors - This measure would develop a program to register, educate, and give notices of violation (NOVs) to subcontractors through Rule 310. This program would not preclude the issuance of NOVs to the permit holder.	County	376 (1% increase in compliance with Rule 310)
14. Reduce dragout and trackout emissions from nonpermitted sources - This measure would add dragout provisions to Rules 310 and 310.01 and enforce dragout and trackout provisions for nonpermitted sources. For example, trackout from salvage yards would be enforced by the County.	County	200 (5% decrease in trackout)
15. Cover loads/haul trucks in Apache Junction - This measure would require loaded and empty haul trucks to be covered in the City of Apache Junction.	City of Apache Junction	--- ¹
16. Require dust coordinators at earthmoving sites of 5-50 acres - This measure would require an onsite dust control coordinator to be present on sites of 5 to 50 acres during active soil and rock excavation, soil and rock removal, and construction operations, including road construction operations, and related transport activities at access points to paved or unpaved roads. This person could also perform other tasks, but would be responsible for managing dust prevention and control on the site.	County	2,035 (5% increase in compliance with Rules 310 and 316)
General		
17. Create a dedicated funding source for the Maricopa County Air Program - This measure would create a dedicated funding source for the County Air Program to support increased enforcement of Rule 310.01, and other air programs, as necessary. Example: Restore In-Lieu funding or some other fee to emissions testing, or other approach.	State, County	94 (1% increase in compliance with Rule 310.01)

¹The emission reduction benefit of this measure in the PM-10 nonattainment area is less than 1 ton per year.

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
Industry		
18. Fully implement Rule 316 - This measure would enforce the provisions of Rule 316, adopted by Maricopa County in June 2005, for nonmetallic mineral processing sources of PM-10.	County, private sector	--- ²
19. Require private companies to use PM-10 certified street sweepers on paved areas including parking lots (e.g., Clark County) - This measure would require paved surfaces (e.g., parking lots) owned by private companies to be swept using PM-10 certified street sweepers.	State, private sector	200 (5% reduction in trackout emissions)
20. Provide incentives to shift hours of operation during stagnant conditions in November through February - This measure would provide incentives to postpone activities that generate dust until after 9 a.m. on days between November 1 and February 15 when ADEQ issues a High Pollution Advisory (HPA) under stagnant conditions.	State	--- ³
Nonroad Activities		
21. Ban or discourage use of leaf blowers on high pollution advisory days - This measure would restrict or prohibit the use of leaf blowers on days when ADEQ issues a High Pollution Advisory (HPA).	State, County	--- ⁴
22. Reduce off-road vehicle use in areas with high off-road vehicle activity (e.g., Goodyear Ordinance) - impoundment or confiscation of vehicles for repeat violations - This measure would involve development and enforcement of ordinances or implementation of other actions to prevent or discourage off-road vehicle use in the PM-10 nonattainment area.	State, County, local governments	456 (20% reduction in offroad vehicle emissions)
23. Create a fund to provide incentives to retrofit nonroad diesel engines and encourage early replacements with advanced technologies - This measure would establish funding to offer incentives for owners of older nonroad diesel equipment to retrofit or repower existing engines or replace with newer, less-polluting technology.	State	18 (500 nonroad engines are retrofitted)

²Reductions for this measure will be taken in the 2007 base inventory, unless the full implementation and enforcement of the new Rule 316 provisions occur after 2007.

³This measure does not reduce PM-10 emissions; it shifts the emissions later in the day when there is more vertical mixing in the atmosphere, resulting in lower PM-10 concentrations.

⁴The emission reduction benefit of this measure in the PM-10 nonattainment area is estimated to be less than 1 ton per year.

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
24. Encourage early implementation of clean fuels for nonroad equipment. - This measure would provide incentives for nonroad equipment to be retrofitted with diesel retrofit kits, newer clean diesel technologies and fuels; or “green diesel” biodiesel fuel, or other fuels that are cleaner than petroleum diesel.	State	2 (5% of nonroad engines use ultra-low sulfur fuel)
25. Ban leaf blowers from blowing debris into streets - This measure would ban leaf blowers from blowing debris into the streets in Maricopa County.	State, County	--- ⁵
26. Implement a leaf blower outreach program - This measure would involve the development and distribution of educational materials on reducing leaf blower dust and would require the private sector to provide the printed materials to customers who purchase or rent leaf blowers.	County, private sector	— ⁶
27. Regulate and increase enforcement of ATV use on State land - This measure would require the State to regulate and increase enforcement of all-terrain and off-highway vehicle use on State lands located in Area A.	State	228 (10% reduction in offroad vehicle emissions)
28. Ban ATV use on high pollution days - This measure would ban ATV use on High Pollution Advisory days in Area A.	State	63 (50% compliance on 20 HPA days per year)
Paved Roads		
29. Sweep streets with PM-10 certified street sweepers - This measure would require all public paved roads in the PM-10 nonattainment area to be swept with purchased or contracted PM-10 certified sweepers.	County, local govts	855 (19 PM-10 certified sweepers purchased in 2008 - 2009)
30. Retrofit onroad diesel engines with particulate filters - This measure would establish a program with financial incentives to encourage the voluntary retrofit of pre-2007 onroad diesel vehicles with particulate filters and oxidation catalysts.	State, County	39 (500 vehicles are retrofitted)

⁵The emission reduction benefit of this measure in the PM-10 nonattainment area is estimated to be less than 1 ton per year.

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
Unpaved Parking Lots		
31. Pave or stabilize existing unpaved parking lots (e.g., upgrade to Phoenix Parking Code) - strengthen enforcement - This measure would involve strengthening and proactively enforcing dust control rules or ordinances that reduce fugitive dust and PM-10 emissions from existing unpaved parking and vehicle maneuvering areas.	County, local governments	600 (20% decrease in emissions from unpaved parking lots)
Unpaved Roads		
32. Pave or stabilize existing public dirt roads and alleys - This measure would revise Rule 310.01 to require paving or stabilizing of public dirt roads that carry less than 150 vehicles per day (e.g., more than 50 vehicles per day).	County, local governments	4,750 (100 miles of public dirt roads carrying 50-150 ADT are paved, and 100 miles, are stabilized)
33. Limit speeds to 15 miles per hour on high traffic dirt roads - This measure would require 15 mph speed limit signs to be posted on dirt roads in the PM-10 nonattainment area that carry high traffic (e.g., 50-150 vehicles per day).	County, local governments	1,200 (15 mph speed limits are posted on 100 miles of stabilized dirt roads carrying 50-150 ADT)
34. Prohibit new dirt roads including those associated with lot splits - This measure would prevent the construction of new dirt roads (e.g., prohibit wildcat subdivisions; require paving of roads before issuing a building permit) in the PM-10 nonattainment area.	State, County	--- ⁶
Unpaved Shoulders		
35. Pave or stabilize unpaved shoulders - This measure would require paving or stabilizing dirt shoulders on paved public roads that carry a high level of traffic (e.g., more than 2,000 vehicles or 50 heavy duty trucks per average weekday).	County, local governments	43 (25 miles of dirt shoulders are paved; and 25 miles are stabilized)

⁶This measure offsets the annual growth in emissions associated with creation of new dirt roads in the PM-10 nonattainment area.

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
Unpaved Surfaces		
36. Create a fund for paving and stabilizing in high pollution areas - This measure would create a particulate mitigation fund to pave and stabilize land surfaces in and around high pollution areas - Establish a grant program for private businesses to stabilize and pave - Direct fine monies from Maricopa County for stabilization efforts.	State, County, private sector	13 (10% reduction in unpaved road and parking lot emissions applied to 2.5% of the inventory)
Vacant Lots		
37. Strengthen and increase enforcement of Rule 310.01 for vacant lots - This measure would increase the frequency of inspections and enforcement actions to reduce dust emitted by vacant lots.	County	3 ⁷ (1% increase in compliance with Rule 310.01 for vacant lots)
38. Restrict vehicular use and parking on vacant lots (e.g., Phoenix) - This measure would strengthen existing rules and ordinances that prohibit vehicle trespass on vacant land.	State, County, local governments	3 ⁷ (1% increase in compliance with Rule 310.01 for vacant lots)
39. Enhanced enforcement of trespass ordinances and codes - This measure would increase the enforcement of vehicle trespass ordinances and codes for vacant lots.	County, local governments	3 ⁷ (1% increase in compliance with Rule 310.01 for vacant lots)
40. Ability to assess liens on parcels to cover the costs of stabilizing them - This measure would give the County the authority to provide that the costs of stabilizing the disturbed areas on any vacant lot be assessed upon the property to which the stabilization was applied.	State, County	3 ⁷ (1% increase in compliance with Rule 310.01 for vacant lots)

⁷This reduction is based on the windblown dust emissions estimates in the Draft 2005 Periodic Emission Inventory for PM-10 (PEI). Work is underway to improve these estimates and it is anticipated that the credit for this measure will increase, based on the revised emissions for vacant lots in the final PEI.

MEASURE	POTENTIAL IMPLEMENTING ENTITY	ESTIMATED PM-10 EMISSIONS REDUCTION IN TONS PER YEAR
Woodburning		
41. Increase fines for open burning (currently \$25) - This measure would increase the maximum fine for open burning in ARS Title 49-501 from \$25 per occurrence to a level that would serve as a deterrent (e.g., \$500 per occurrence).	State, County	--- ⁸
42. Restrict use of outdoor fireplaces and pits and ambience fireplaces in the hospitality industry - This measure would prohibit burning in outdoor fireplaces, outdoor pits, and ambience fireplaces in the hospitality industry, and ban other nonessential wood fires on days during the period November 1 - February 15 when ADEQ issues a High Pollution Advisory (HPA).	State, County	___ ⁸

Preliminary Total Emission Reductions for the Five Percent Plan for PM-10

14,988 tons

- Five Percent Plan for PM-10 Preliminary Emission Reduction Target = 4,594 tons/year
 - PM-10 emission reductions needed in 2008 = 4,594 tons
 - Additional PM-10 emission reductions needed in 2009 = 4,594 tons
 - Contingency measures needed = one year of reasonable further progress = 4,594 tons
 - Total reduction needed if attainment is achieved at all monitors in 2007-2009 = 13,782 tons
 - Residual = 1,206 tons
- If violations occur in 2007, another 4,594 ton reduction will be needed in 2010
 - The 4,594 tons needed in 2010 will be covered by the contingency measures, which will be fully implemented with the Plan measures, as a safeguard
 - EPA encourages early implementation of contingency measures
 - Additional contingency measures would then be needed. For example, the suggested list of measures may need to be strengthened and new measures considered.

Special Notes:

1. Further refinement of these measures will be made as additional information becomes available through the planning process. Maricopa County is in the process of refining the Draft 2005 Periodic Emissions Inventory for PM-10. The Maricopa Association of Governments will be conducting air quality modeling in the summer of 2007.
2. The Governor's Agricultural Best Management Practices Committee is in the process of evaluating potential measures to further reduce PM-10 emissions from agriculture for consideration for the Five Percent Plan for PM-10. This Committee was established by law in 1998 (Arizona Revised Statutes, Title 49-457) to develop an agricultural PM-10 general permit that would address the need for controls on agricultural operations. The potential agricultural measures will be presented to the MAG Air Quality Technical Advisory Committee for consideration.

⁸The emission reduction benefit of this measure in the PM-10 nonattainment area is estimated to be less than 1 ton per year.

Revised to reflect
MAG Regional
Council approval on
March 28, 2007

**TABLE 5 - AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATIONS
ON THE SUGGESTED LIST OF MEASURES
TO REDUCE PM-10 PARTICULATE MATTER**

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>Agriculture The Governor's Agricultural Best Management Practices Committee is in the process of evaluating potential measures to further reduce PM-10 emissions from agriculture for consideration for the Five Percent Plan for PM-10. This Committee was established by law in 1998 (Arizona Revised Statutes, Title 49-457) to develop an agricultural PM-10 general permit that would address the need for controls on agricultural operations. The potential agricultural measures will be presented to the MAG Air Quality Technical Advisory Committee for consideration.</p>						
<p>Fugitive Dust Control Rules</p>						
<p>1. Public education and outreach (e.g., Clark County) with assistance from local governments - This measure would involve publicity campaigns (e.g., Bring Back Blue) that increase public awareness of the PM-10 problem and discourage citizens from participating in activities that generate airborne dust.</p>	<p>Recommended on March 1</p>	<p>\$7,898/ton (VMT reduction of 0.5% in the nonattainment area)</p>	<p>131 tons/yr (2.9% of target)</p>	<p>Negligible impact on the sources of PM-10 emissions near the monitors on the worst days in 2005/2006</p>	<p>Minor impact, if the public routinely complains about visible dust from sources located near a PM-10 monitor</p>	<p>County, local govts</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>2. Extensive Dust Control Training Program (e.g., Clark County) - This measure would involve conducting more frequent dust control training classes and implementing a formal certification program. The County would provide advanced training to representatives of trade associations to qualify them to conduct classes and issue certifications. <i>The County video on dust control rules and practices will be updated and distributed to public agencies and private companies for use in training their employees. Subcontractors will be included in the dust control training and certification program.</i></p>	<p>Recommended on March 1; addition from Measure #2 is shown in italics; addition on March 9 is shown in bold italics.</p>	<p>\$12,494/ton (additional water truck full-time on site)</p>	<p>313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance</p>	<p>Large impact, when an increased compliance rate is applied to construction sources that contributed to the exceedance at the Higley monitor on 1/24/06</p>	<p>Moderate impact, if training reduces dust generation by construction sources near PM-10 monitors</p>	<p>County, private sector</p>
<p>3. Core Dust Control Training Program with video provided to local governments and private sector - This measure involves developing visual and written materials that would be used by the public agencies and private companies to train their employees on the dust control rules and effective dust reduction practices.</p>	<p>Combined with Measure #2 on March 1</p>	<p>\$9,990/ton (additional water truck ½ time on site)</p>	<p>313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance</p>	<p>Large impact, when an increased compliance rate is applied to construction sources that contributed to the exceedance at the Higley monitor on 1/24/06</p>	<p>Moderate impact, if training reduces dust generation by construction sources near PM-10 monitors</p>	<p>County, local govts, private sector</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>4. Dust Managers required at construction sites of 50 acres and greater (e.g., Clark County) - This measure would require a dust manager to be present on construction sites where 50 or more acres of soil are disturbed.</p>	<p>Recommended on March 1</p>	<p>\$14,285/ton (additional water truck full time on site)</p>	<p>313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance</p>	<p>Large impact, when an increased compliance rate is applied to construction sources that contributed to the exceedance at the Higley monitor on 1/24/06</p>	<p>Large impact, if the manager minimizes dust generation on construction sites near a PM-10 monitor and ensures that all disturbed soil is stabilized during high winds (>15 mph)</p>	<p>County</p>
<p>5. Dedicated enforcement coordinator for unpaved roads, unpaved parking, and vacant lots (e.g., Clark County) - This measure would require that additional resources be dedicated to strengthen enforcement of Rule 310.01 for unpaved roads, unpaved parking lots, and vacant disturbed lots.</p>	<p>Recommended on March 1</p>	<p>\$534/ton (application of dust palliatives on all 224.3 miles of high traffic unpaved roads)</p>	<p>45 tons/yr (1.0% of target) for every 1% increase in Rule 310.01 compliance for unpaved roads and parking lots</p>	<p>Moderate impact, when an increased compliance rate is applied to the unpaved roads and parking areas that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06; small impact due to higher compliance rate for vacant lots that contributed to an exceedance at the Higley monitor on 1/24/06</p>	<p>Large impact, if the increased enforcement of Rule 310.01 reduces dust generation from unpaved roads and parking lots near a PM-10 monitor and ensures that disturbed soil on vacant lots is stabilized during high winds (>15 mph)</p>	<p>County</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
6. Strengthen the stringency and enforcement of the trackout provisions - This measure would strengthen the existing trackout provisions (e.g., reduce the 50' length that requires rapid cleanup), include new provisions for dragout (e.g., no visible dust past the property line), and increase the frequency of inspections and notices of violation issued for visible trackout and dragout.	Not Recommended on March 1 due to \$2.5M/ton cost-effectiveness	\$2,499,750/ton (increased sweeping of unpaved access points by industry)	40 tons/yr (0.9% of target) for every 1% increase in Rule compliance for trackout or dragout	Large impact, when an increased compliance rate is applied to the trackout and dragout that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06	Large impact, if the increased compliance reduces trackout on roads near a PM-10 monitor	County
7. Increase fines for dust control violations and continue to publish the list of violators - This measure would change ARS 49-463 and 49-513 to increase the current ceiling of \$10,000 per day per violation of the County's PM-10 rules and publicize the names of violators and the dollar penalty assessed.	Not Recommended on March 1 due to negligible impacts	Unknown (elasticity of response to increased fines is not available)	Negligible impact	Negligible impact	Negligible impact	State, County
8. Establish a certification program for Dust Free Developments to serve as an industry standard - This measure would create a program to certify and publicize companies that routinely demonstrate exceptional efforts to reduce airborne dust.	Recommended on March 1	\$10,752/ton (80% emission reduction for participating companies)	3.13 tons/yr (6.8% of target) for every 1% increase in Rule compliance 310 compliance	Large impact, when an increased compliance rate is applied to construction sources that contributed to the exceedance at the Higley monitor on 1/24/06	Minor impact, if certification results in dust reductions by sources near PM-10 monitors	State, County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
9. Better defined tarping requirements in Rule 310 to include enclosure of the bed - This measure would modify Rule 310 to require that the cargo compartments of trucks whether loaded or empty be fully enclosed prior to traveling on paved public roads.	Recommended on March 1	\$14,963/ton (reduction per covered truck, assuming 13 trips/day)	313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance	Large impact, when an increased compliance rate is applied to construction sources that contributed to the exceedance at the Higley monitor on 1/24/06	Minor impact, if better tarping reduces dust near PM-10 monitors	County
10. Conduct just-in-time grading (i.e., once a parcel of land is cleared, stabilization or work on the parcel would be required within a certain number of days) - This measure would require that disturbed areas (e.g., 10 acres or more) on construction sites would have to be stabilized within a short time (e.g., one week) after grading occurred.	Not Recommended on March 1 due to negligible impacts	Unknown (minimize emissions under high wind conditions)	Negligible impact; already covered by Rule 310	Negligible impact	Negligible impact	County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>11. Establish self-monitoring requirements for permitted sources larger than 50 acres - This measure would require large permitted sources to conduct continuous monitoring to measure meteorological and PM-10 concentrations to determine when dust generation on-site needs to be reduced.</p>	<p>Not Recommended on March 1 due to impact on a small number of permitted sources (i.e., > 50 acres)</p>	<p>\$21,530/ton (additional water truck full-time on site)</p>	<p>18 tons/yr (0.4% of target) for every 1% increase in Rule 316 effectiveness; 313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance</p>	<p>Large impact, if permitted sources near the Salt River Area monitors take action to reduce dust generation and increase remediation activities (e.g., street sweeping) when PM-10 concentrations at their onsite monitor(s) exceed some threshold value</p>	<p>Large impact, if monitored PM-10 values trigger reductions in emissions near a PM-10 monitor</p>	<p>County</p>
<p>12. Conduct mobile monitoring to measure PM-10 and issue NOVs - This measure involves deployment of a vehicle that has been instrumented to monitor PM-10 and meteorological conditions, so that sources can be identified, and immediate remediation and/or enforcement actions taken.</p>	<p>Recommended on March 1</p>	<p>\$54,233/ton (use of a gravel bed to control emissions from vehicles traveling on an unpaved surface)</p>	<p>94 tons/yr (2.0% of target) per 1% increase in compliance with dust control rules by nonpermitted sources</p>	<p>Large impact, when the increased compliance rate is applied to the nonpermitted sources that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06</p>	<p>Large impact, if the vehicle is used to identify sources and immediately reduce visible dust near PM-10 monitors</p>	<p>County</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>13. Cease dust generation activities during stagnant conditions - This measure would require that dust generation activities be curtailed on days between November 1 and February 15 when ADEQ issues a High Pollution Advisory (HPA) due to stagnant weather conditions.</p>	<p>Not Recommended on March 1 due to unknown cost effectiveness and negligible impact on five percent reduction requirement</p>	<p>Unknown (During the last 3 years, there have been an average of 8 HPA days, 9 stagnation days, and 10 PM-10 exceedance days between Nov 1 and Feb 15 of each year)</p>	<p>Negligible impact on annual PM-10 emission reductions due to the limited number of days involved</p>	<p>This measure would contribute to modeling attainment at the Salt River Area monitors on 12/12/05 and 12/13/05, but only if curtailment of activities occurred during High Pollution Watches, as well as HPAs. Adding high wind HPA days to the measure would also assist in modeling attainment at the Salt River Area monitors on 2/15/06. If High Pollution Watches on windy days were added, this measure would also be useful in modeling attainment at the Higley monitor on 1/24/06</p>	<p>Moderate impact, if sources near monitors cease dust generation activities on HPA days under stagnant conditions. Impact is diluted by the fact that HPAs do not always coincide with PM-10 exceedance days; also this measure does not address cessation of activities on high wind HPA days</p>	<p>County</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>14. Establish maintenance requirements for paved roads and parking lots - This measure would modify Rule 310.01 to require that public and private paved roads and parking lots be maintained to minimize visible dust (e.g., the silt loading level on the paved surfaces should not exceed a specified threshold).</p>	<p>Not Recommended on March 1 due to \$320K/ton cost effectiveness</p>	<p>\$320,444/ton (Sweep a parking lot once every two weeks)</p>	<p>40 tons/yr (0.9% of target) for every 1% increase in Rule compliance for trackout and dragout</p>	<p>Large impact, when an increased compliance rate is applied to the trackout and dragout that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06</p>	<p>Large impact, if the increased maintenance of paved roads and parking lots reduces trackout and dragout near a PM-10 monitor</p>	<p>County</p>
<p>15. Conduct nighttime and weekend inspections - This measure would involve proactive inspections of nonpermitted and permitted PM-10 sources during non-daylight hours <i>and on weekends</i>.</p>	<p>Recommended on March 1; Recommended with additions shown in italics on March 6</p>	<p>\$10,752/ton (2 additional water trucks and drivers per facility)</p>	<p>94 tons/yr (2.0% of target) per 1% increase in compliance with dust control rules by nonpermitted sources; 18 tons/yr (0.4% of target) for every 1% increase in Rule 316 effectiveness; 313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance</p>	<p>Large impact, when the increased compliance rates are applied to the sources that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06</p>	<p>Large impact, if the pre-dawn inspections identify sources and initiate actions to immediately reduce visible dust near PM-10 monitors</p>	<p>County</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>16. Increase inspection frequency for permitted facilities - This measure would increase the number of proactive inspections conducted at permitted facilities.</p>	<p>Recommended on March 1</p>	<p>\$65,765/ton (increase watering to achieve 80% rule compliance)</p>	<p>18 tons/yr (0.4% of target) for every 1% increase in Rule 316 effectiveness</p>	<p>Moderate impact, when the increased compliance rate is applied to Rule 316 sources near the Salt River Area monitors on 12/12/05 and 2/15/06</p>	<p>Moderate impact, if increased inspections result in reductions in PM-10 emissions near a monitor</p>	<p>County</p>
<p>17. Increase number of proactive inspections in areas of highest PM-10 emissions densities</p> <ul style="list-style-type: none"> - intensity training and education - incentive program for compliance <p>- This measure would focus on the areas of highest PM-10 emissions density: by increasing the number of inspectors and proactive inspections, conducting on-site training, offering incentives to reduce PM-10, and performing community outreach.</p>	<p>Recommended on March 1</p>	<p>\$65,900/ton (facilities are inspected twice per day; compliance response: increase haul road watering from once every two hours to once per hour)</p>	<p>18 tons/yr (0.4% of target) for every 1% increase in Rule 316 effectiveness</p>	<p>Moderate impact, when the increased compliance rate is applied to Rule 316 sources near the Salt River Area monitors on 12/12/05 and 2/15/06</p>	<p>Moderate impact, if increased inspections result in reductions in PM-10 emissions near a monitor</p>	<p>County</p>

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
18. Notify violators more rapidly to promote immediate compliance - This measure would require inspectors that observe visible dust (e.g., opacity or trackout levels that are approaching rule limits) to call the permit holder and make reasonable efforts to inform a person on-site, so that measures can be taken to prevent, reduce, or mitigate dust generation before a violation occurs.	Recommended on March 1	\$6,100/ton (for unpaved parking); \$239,050/ton (for vacant lots)	313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance; 18 tons/yr (0.4% of target) for every 1% increase in Rule 316 effectiveness	Large impact, when increased compliance rates are applied to sources that contributed to the exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06 and the exceedance at the Higley monitor on 1/24/06	Moderate impact, if the inspector's early notification efforts result in immediate dust reductions by sources near PM-10 monitors	County
Industry						
19. Fully implement Rule 316 - This measure would enforce the provisions of Rule 316, adopted by Maricopa County in June 2005, for nonmetallic mineral processing sources of PM-10.	Recommended on March 6	\$4,802/ton (minimum for a large facility); \$59,750/ton (maximum for a small facility)	18 tons/yr (0.4% of target) for every 1% increase in Rule 316 effectiveness	Moderate impact, when the increased compliance rate is applied to Rule 316 sources near the Salt River Area monitors on 12/12/05 and 2/15/06	Moderate impact, if new provisions of rule 316 result in reductions in PM-10 emissions near a monitor	County, private sector
20. Require private companies to use PM-10 certified street sweepers on paved areas including parking lots (e.g., Clark County) - This measure will require paved surfaces (e.g., parking lots) owned by private companies to be swept using PM-10 certified street sweepers.	Recommended on March 6	\$356,350/ton (Sweep a parking lot once every two weeks)	40 tons/yr (0.9% of target) for every 1% increase in Rule compliance for trackout and dragout	Large impact, when an increased compliance rate is applied to the trackout and dragout that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06	Large impact, if the increased maintenance of paved roads and parking lots reduces trackout and dragout near a PM-10 monitor	State, private sector

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<p>21. Shift hours of operation during stagnant conditions in November through February - This measure would require that industry delay dust generation activities until 9 a.m. on days between November 1 and February 15 when ADEQ issues a High Pollution Advisory (HPA) under stagnant conditions:</p> <p>21. Provide incentives to shift hours of operation during stagnant conditions in November through February - This measure would provide incentives to postpone activities that generate dust until after 9 a.m. on days between November 1 and February 15 when ADEQ issues a High Pollution Advisory (HPA) under stagnant conditions.</p>	<p>Not Recommended on March 6 due to potential economic disruption</p> <p>Substitute Measure #21 Recommended on March 6</p>	<p>Unknown (During the last 3 years, there have been an average of 8 HPA days, 9 stagnation days, and 10 PM-10 exceedance days between Nov 1 and Feb 15 of each year)</p>	<p>No impact; emissions are deferred, but not reduced</p>	<p>This measure would have a large impact on modeling attainment at the Salt River Area monitors on 12/12/05 and 12/13/05, but only if High Pollution Watch days are added to HPAs; otherwise this measure would have no impact</p>	<p>Moderate impact, if sources near monitors cease dust generation activities on HPA days under stagnant conditions. This impact is diluted by the fact that HPAs are not always issued on PM-10 exceedance days during stagnant conditions</p>	<p>State</p> <p>State</p>
<p>22. Model cumulative impacts for new or modified existing sources - This measure would require industry to include the impacts of adjacent facilities, when modeling the PM-10 impacts of new facilities or modifications to existing facilities and obtain offsets if concentration thresholds are exceeded.</p>	<p>Not Recommended on March 6 due to uncertainties about the number and size of sources impacted</p>	<p>\$109/ton (paving an unpaved road as an emission offset for a new or modified facility); this number will increase as low cost alternatives are selected.</p>	<p>No impact; emissions increases would be offset</p>	<p>No impact</p>	<p>Moderate impact, if the new or modified facility is adjacent to other large sources of PM-10 emissions and is also near a PM-10 monitor</p>	<p>State</p>

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23. Conduct night time and weekend inspections - This measure would involve proactive inspections of industrial and construction sources of PM-10 during non-daylight hours and on weekends.	Combined with Measure #15	\$10,752/ton (2 additional trucks and drivers per facility)	18 tons (0.4% of target) for every 1% increase in Rule 316 effectiveness; 313 tons/yr (6.8% of target) for every 1% increase in Rule 310 compliance	Moderate impact, when the increased compliance rate is applied to sources near the Salt River Area monitors on 12/12/05 and 2/15/06	Moderate impact, if proactive inspections reduce PM-10 emissions during pre-dawn hours under stagnant conditions near a monitor; negligible value of weekend inspections because exceedances rarely occur on weekends, except as a result of high winds	County
Nonroad Activities						
24. Ban or discourage use of leaf blowers on high pollution advisory days - This measure would restrict or prohibit the use of leaf blowers on days when ADEQ issues a High Pollution Advisory (HPA).	Recommended on March 6	\$21,851/ton (deferring leaf blowing until the next scheduled visit)	0.004 tons/yr (0.0% of target) per leaf blower not used on a HPA day	Negligible impact	Negligible impact	State, County
25. Encourage use of leaf vacuums to replace blowers - This measure would provide incentives and publicity to encourage replacement of leaf blowers with vacuum units.	Not Recommended on March 6 due to lack of impact	N/A (leaf vacuums are not currently designed to capture PM-10; so the emissions reduction would be zero)	No reduction in annual emissions	No impact	No impact	State, County

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<p>26. Reduce off-road vehicle use in areas with high off-road vehicle activity (e.g., Goodyear Ordinance) - impoundment or confiscation of vehicles for repeat violations</p> <p>- This measure would involve development and enforcement of ordinances or implementation of other actions to prevent or discourage off-road vehicle use in the PM-10 nonattainment area.</p>	<p>Recommended on March 6</p>	<p>\$230/ton (offroad activity in Goodyear ceased within a week)</p>	<p>45 tons/yr (1.0% of target) for restricting off-road vehicle use of 2.1% of the passive open space in the PM-10 nonattainment area (in Goodyear).</p>	<p>No impact in the Salt River Area monitors as measures to reduce off-road vehicle use have already been implemented; moderate impact if implemented in the area impacting the Higley monitor on 1/24/06</p>	<p>Moderate impact if off-road vehicle use is curtailed near PM-10 monitors</p>	<p>State, County, local govts</p>
<p>27. Create a fund to provide incentives to retrofit nonroad diesel engines and encourage early replacements with advanced technologies - This measure would establish funding to offer incentives for owners of older nonroad diesel equipment to retrofit or repower existing engines or replace with newer, less-polluting technology.</p>	<p>Recommended on March 6</p>	<p>\$44,000/ton of PM-2.5 (particulate filter); \$52,000/ton of PM-2.5 (oxidation catalyst)</p>	<p>18 tons/yr (0.4% of target) per 500 nonroad diesel engines are retrofitted with particulate filters and oxidation catalysts</p>	<p>Negligible impact</p>	<p>Negligible impact</p>	<p>State</p>

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<p>28. Update the statutes to require ultra-low sulfur diesel fuels for nonroad equipment - This measure would revise ARS 41-2083J to require use of ultra-low sulfur fuel in nonroad engines before the federally-mandated deadline of June 2010. (Locomotives and marine vessels do not have to use the new fuel until 2012.)</p> <p>28. Encourage early implementation of clean fuels for nonroad equipment. -This measure would provide incentives for nonroad equipment to be retrofitted with diesel retrofit kits, newer clean diesel technologies and fuels; or "green diesel" biodiesel fuel, or other fuels that are cleaner than petroleum diesel.</p>	<p>Not Recommended on March 6 due to negligible impacts</p> <p>Substitute Measure #28 Recommended on March 6; description of measure provided by Beverly Chenausky of ADOT on March 8</p>	<p>\$16,000/ton of sulfates (use of ultra-low sulfur fuel in a typical nonroad engine)</p>	<p>37 tons/yr (0.8% of target) if all nonroad engines in the PM-10 nonattainment area use ultra-low sulfur diesel fuel</p>	<p>Negligible impact</p>	<p>Negligible impact</p>	<p>State</p>
<p>Paved Roads</p>						
<p>29. Sweep streets with PM-10 certified street sweepers - This measure would require all public paved roads in the PM-10 nonattainment area to be swept with purchased or contracted PM-10 certified sweepers.</p>	<p>Recommended on March 6</p>	<p>\$4/ton (marginal cost and benefit of buying a PM-10 certified instead of a noncertified sweeper)</p>	<p>45 tons/yr (1.0% of target) per PM-10 certified street sweeper</p>	<p>Negligible impact</p>	<p>Moderate impact, if PM-10 certified units are used to sweep streets with high silt loadings on a frequent basis near PM-10 monitors</p>	<p>County, local govts</p>

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30. Retrofit onroad diesel engines with particulate filters - This measure would establish a program with financial incentives to encourage the voluntary retrofit of pre-2007 onroad diesel vehicles with particulate filters and oxidation catalysts.	Recommended on March 6	\$107,000/ton of PM-2.5 (particulate filters); \$133,000/ton of PM-2.5 (oxidation catalysts)	39 tons/yr (0.8% of target) per 1,000 vehicles retrofitted with a diesel particulate filter and oxidation catalyst.	Negligible impact	Negligible impact	State, County
31. Repave or overlay paved roads with rubberized asphalt - This measure would involve repaving or overlaying paved roads with materials that reduce PM-10 emissions by reducing vehicle tire wear.	Not Recommended on March 6 due to negligible impacts	\$631,000/ton (for freeways); \$2,681,000/ton (for arterials); \$4,290,000/ton (for collectors); 50% reduction in PM-10 emissions due to reduced tire wear	0.032 tons/yr (0.0% of target) per centerline mile of repaved arterial, carrying 10,000 vehicles per day or more	Negligible impact	Negligible impact	State, County, local govts
Unpaved Parking Lots						
32. Pave or stabilize existing unpaved parking lots (e.g., upgrade to Phoenix Parking Code) - strengthen enforcement - This measure would involve strengthening and proactively enforcing dust control rules or ordinances that reduce fugitive dust and PM-10 emissions from existing unpaved parking and vehicle maneuvering areas.	Recommended on March 6	\$1,754/ton (paving a parking lot of one-tenth of an acre); \$11,292/ton (applying dust palliatives to the same size lot)	94 tons/yr (2.0% of target) per 1% increase in compliance with dust control rules/ordinances for unpaved parking lots	Large impact, when the increased compliance rate is applied to the unpaved parking areas that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06	Large impact, if the increased compliance reduces emissions from unpaved parking and vehicle maneuvering areas near a PM-10 monitor	County, local govts

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Unpaved Roads						
33. Pave or stabilize existing public dirt roads and alleys - This measure would revise Rule 310.01 to require paving or stabilizing of public dirt roads that carry less than 150 vehicles per day (e.g., more than 50 vehicles per day).	Recommended on March 6 with additions shown in italics	\$109/ton (applying dust palliatives to 224.3 miles of unpaved roads averaging 120 vehicles/day)	32 tons/yr (0.7% of target) per mile of dirt road that is paved	Moderate impact, if dirt roads in the Salt River Area and the Higley modeling domain are paved by 2009	Large impact, if dirt roads near a monitor are paved	County, local govts
34. Limit speeds to 15 miles per hour on high traffic dirt roads - This measure would require 15 mph speed limit signs to be posted on dirt roads in the PM-10 nonattainment area that carry high traffic (e.g., 50-150 vehicles per day).	Recommended on March 6	\$3,337/ton (speeds are reduced from 25 to 15 mph on 224.3 miles of unpaved roads averaging 120 vehicles/day)	0.5 tons/yr (0.01% of target) per mile of dirt road with 15 mph speed limits; since this would be difficult to enforce, the assumed control effectiveness is low (i.e., 18%).	Negligible impact	Negligible impact	County, local govts
35. Prohibit new dirt roads including those associated with lot splits - This measure would prevent the construction of new dirt roads (e.g., prohibit wildcat subdivisions; require paving of roads before issuing a building permit) in the PM-10 nonattainment area.	Recommended on March 6	\$2,646/ton (paving one mile of new dirt road)	Without this measure, projected 2007-2009 PM-10 emissions for unpaved roads will increase each year	Moderate impact if new dirt roads are created in the Salt River Area or in the modeling domain for the Higley monitor before 2009	Moderate impact, if new dirt roads are created near monitors	State, County

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Unpaved Shoulders						
36. Pave or stabilize unpaved shoulders - This measure would require paving or stabilizing dirt shoulders on paved public roads that carry a high level of traffic (e.g., more than 2,000 vehicles or 50 heavy duty trucks per average weekday).	Recommended on March 6	\$18,452/ton (paving of 8-foot dirt shoulders)	40 tons/yr (0.9% of target) for every 1% increase in Rule compliance for trackout and dragout	Large impact, when an increased compliance rate is applied to dragout and trackout emissions from unpaved shoulders that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06 and the Higley monitor on 1/24/06	Large impact, if the increased compliance reduces trackout and dragout emissions attributable to unpaved shoulders near a PM-10 monitor	County, local govts
Unpaved Access Points						
37. Pave or stabilize unpaved access to paved roads - This measure would require additional measures to reduce trackout and dragout from vehicles accessing paved public roads via unpaved access points (e.g., require paving of access points onto roads with high traffic, e.g., 5,000 vehicles or 50 heavy duty trucks per average weekday).	Withdrawn on March 9 due to duplication with Measure #56	\$168,025/ton (gravel pad plus grizzly used by 40 heavy duty trucks exiting a facility with one unpaved access point each day)	40 tons/yr (0.9% of target) for every 1% increase in Rule compliance for trackout and dragout	Large impact, when an increased compliance rate is applied to the dragout and trackout emissions from unpaved access points that contributed to exceedances at the Salt River Area monitors on 12/12/05 and 2/15/06 and the Higley monitor on 1/24/06	Large impact, if the increased compliance reduces trackout and dragout emissions attributable to unpaved access points near a PM-10 monitor	County, local govts

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Vacant Lots						
38. Strengthen and increase enforcement of Rule 310.01 for vacant lots - This measure would increase the frequency of inspections and enforcement actions to reduce dust emitted by vacant lots.	Recommended on March 6	\$239,000/ton (100% reduction in trespass rates on vacant lots due to placement of barriers)	3 tons/yr (0.07% of target) for every 1% increase in Rule compliance for vacant lots	Small impact, when an increased compliance rate is applied to vacant lots that contributed to the exceedances at Salt River Area monitors on 2/15/06 and the Higley monitor on 1/24/06	Moderate impact, if the increased inspections and enforcement make the soil on vacant lots near monitors less erodible during high winds	County
39. Restrict vehicular use and parking on vacant lots (e.g., Phoenix) - This measure would strengthen existing rules and ordinances that prohibit vehicle trespass on vacant land.	Recommended on March 6; The addition of the State as a Potential Implementing Entity was recommended by Maricopa County and approved by the MAG Regional Council on March 28, 2007	\$230,700/ton (100% reduction in trespass rates on vacant lots due to placement of barriers)	3 tons/yr (0.07% of target) for every 1% increase in Rule compliance for vacant lots	Small impact, when an increased compliance rate is applied to vacant lots that contributed to the exceedances at Salt River Area monitors on 2/15/06 and the Higley monitor on 1/24/06	Moderate impact, if the strengthened requirements make the soil on vacant lots near monitors less erodible during high winds	State, County, local govts

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40. Enhanced enforcement of trespass ordinances and codes - This measure would increase the enforcement of vehicle trespass ordinances and codes for vacant lots.	Recommended on March 6	\$51,600/ton (75% reduction in trespass rate due to posting of signs)	3 tons/yr (0.07% of target) for every 1% increase in Rule compliance for vacant lots	Small impact, when an increased compliance rate is applied to vacant lots that contributed to the exceedances at Salt River Area monitors on 2/15/06 and the Higley monitor on 1/24/06	Moderate impact, if the enhanced enforcement of vehicle trespass on vacant lots near monitors decreases soil erosion during high winds	County, local govts
41. Vacant lots stabilized by County if owners do not respond, liens put on property if necessary (e.g., Clark County) - This measure would give the County the authority to place a lien against a property owner in order to recover the costs of stabilizing a vacant disturbed lot.	Not Recommended on March 6 due to \$236K/ton cost-effectiveness; County concerns about recovering costs Measure recommended by Maricopa County and approved by the MAG Regional Council on March 28, 2007	\$235,700/ton (100% reduction in trespass rate due to placement of barriers)	3 tons/yr (0.07% of target) for every 1% increase in Rule compliance for vacant lots	Small impact, when an increased compliance rate is applied to vacant lots that contributed to the exceedances at Salt River Area monitors on 2/15/06 and the Higley monitor on 1/24/06	Large impact, if the authority to place liens is used to stabilize vacant lots near monitors so that soil erosion is minimized during high winds	State, County
41. Ability to assess liens on parcels to cover the costs of stabilizing them - This measure would give the County the authority to provide that the costs of stabilizing the disturbed areas on any vacant lot be assessed upon the property to which the stabilization was applied.						

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
Traffic Flow Improvements						
42. Schedule improvements on parallel streets to retain alternate route options along major north/south and east/west corridors - This measure would involve providing and publicizing alternate routes to divert traffic around road construction projects; with the objective of improving traffic flow and reducing vehicle idling.	Not Recommended on March 6 due to negligible impacts	Unknown (decreases in idling and increases in speeds have no impact on PM-10 emissions, except sulfates)	Negligible impact	Negligible impact	Negligible impact	Local govts
Transit						
43. Build park and ride lots earlier - This measure would accelerate the construction of park and ride lots to increase transit ridership and carpooling.	Not Recommended on March 6 due to negligible impacts	Unknown (PM-10 from bus exhaust and fugitive dust emissions can be higher than cars; need to carpool or achieve 75% bus occupancy to reduce PM-10 emissions)	Negligible impact	Negligible impact	Negligible impact	Local govts

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
44. Coordinate public transit services with Pinal County - This measure would involve coordination between Pinal County and public transit agencies in Maricopa County to provide transit service and reduce the number of vehicle trips between the two counties.	Not Recommended on March 6 due to negligible impacts	Unknown (PM-10 from bus exhaust and fugitive dust emissions can be higher than cars; need to achieve 75% bus occupancy to reduce PM-10 emissions)	Negligible impact	Negligible impact	Negligible impact	Local govts
Woodburning						
45. Increase fines for open burning (currently \$25) - This measure would increase the maximum fine for open burning in ARS Title 49-501 from \$25 per occurrence to a level that would serve as a deterrent (e.g., \$500 per occurrence).	Recommended on March 6	Unknown (No data on # or size of nonpermitted burns; complaints are twice the number for controlled burns; the latter represent 0.01% of the 2005 PM-10 emissions inventory)	Negligible impact	Large impact on modeling attainment at the West 43 rd Avenue monitor on 12/12/05 and 12/13/05	Large impact, if open burning near PM-10 monitors can be curtailed by the imposition of higher penalties	State, County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
46. Restrict use of outdoor fireplaces and pits and ambience fireplaces in the hospitality industry - This measure would prohibit burning in outdoor fireplaces, outdoor pits, and ambience fireplaces in the hospitality industry, and ban other nonessential wood fires on days during the period November 1 - February 15 when ADEQ issues a High Pollution Advisory (HPA).	Recommended on March 6	\$132,000/ton (restrict use on HPA days), \$190,000/ton (retrofit fireplace with EPA-approved device)	Negligible impact	Large impact on modeling attainment at the West 43 rd Avenue monitor on 12/12/05 and 12/13/05, but only if outdoor burning is banned during High Pollution Watches, as well as HPAs.	Moderate impact, if restrictions on outdoor burning on HPA days are enforced near PM-10 monitors; this impact is diluted by the fact that HPAs do not always coincide with PM-10 exceedance days	State, County
THE FOLLOWING NEW MEASURES WERE ADDED AFTER FEBRUARY 23, 2007						
Fugitive Dust Control Rules						
47. Provide timely notification regarding high pollution days - This measure would provide timely notification to permitted and nonpermitted sources when a High Pollution Advisory or High Pollution Watch is issued by ADEQ.	Recommended on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
48. Target intensive community outreach and educational campaigns on measures to reduce fugitive dust in the areas of highest PM-10 emissions density.	Not Recommended on March 9 due to duplication of Measure #17	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
49. Develop a PM-10 program for subcontractors (requested by the Maricopa County Board of Supervisors on April 7, 2004) - have subcontractors acquire a dust control permit - give notice of violation to subcontractors	Replaced by new Measure #49 on March 9 (below)	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
49. Develop a program for subcontractors - This measure would develop a program to register, educate, and give notices of violation (NOVs) to subcontractors through Rule 310. This program would not preclude the issuance of NOVs to the permit holder.	Recommended on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
50. Allow the permit holder to accompany the control officer during an inspection and allow the permit holder 30 minutes to arrive on site. <i>The inspection can commence without waiting for the permit holder to arrive.</i>	Not Recommended on March 9 due to potential weakening of existing rules; language in italics was added on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
51. Allow the permit holder an opportunity to correct within 24 hours. <i>This does not preclude the County's issuance of an NOV.</i>	Not Recommended on March 9 due to potential weakening of existing rules; language in italics was added on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
52. No duplicate fines by MCAQD at the permitted site - Measures #49-51 above are contingent upon this measure. 52. No duplicate notices of violation (NOVs) or fines by MCAQD at the permitted site.	Replaced by new Measure #52 on March 9 (below) Not Recommended on March 9 due to potential weakening of existing rules	Measure was received too late to be evaluated Measure was received too late to be evaluated	Measure was received too late to be evaluated Measure was received too late to be evaluated	Measure was received too late to be evaluated Measure was received too late to be evaluated	Measure was received too late to be evaluated Measure was received too late to be evaluated	County County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
53. Require property owners within cities, towns and counties in Area A to stabilize vacant lots - Tighten up the language in Rule 310.01.	Not Recommended on March 9 due to duplication of Measure #38	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts
54. Opportunities for notification and rapid compliance for violations of Rule 310.	Not Recommended on March 9 due to duplication of Measure #18	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
55. Replace 20 percent opacity limit in Rule 310.01 with "no visible dust across the property line" and proactively enforce for nonpermitted sources - reduces PM-10 emissions from dragout, unpaved roads, unpaved access points, unpaved parking areas and poorly maintained paved roads.	Replaced by new Measure #55 on March 9 (below)	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
55. Add "no visible dust across the property line" to Rule 310.01 and proactively enforce for nonpermitted sources - reduces PM-10 emissions from dragout, unpaved roads, unpaved access points, unpaved parking areas and poorly maintained paved roads	Not Recommended on March 9 due to excessive stringency	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
56. Reduce dragout and trackout emissions from nonpermitted sources - This measure would add dragout provisions to Rules 310 and 310.01 and enforce dragout and trackout provisions for nonpermitted sources. <i>For example, trackout from salvage yards would be enforced by the County.</i>	Recommended with addition shown in italics on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
57. Provide law enforcement certification for inspectors assigned to enforce fugitive dust controls for nonpermitted sources	Not Recommended on March 9 due to limited resources for training inspectors	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County
58. Covered loads/haul trucks to authorize in Apache Junction portion of Area A (ARS 9-500.27).	Replaced by new Measure #58 on March 9 (below)	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, Pinal County
58. Cover loads/haul trucks in Apache Junction - This measure would require loaded and empty haul trucks to be covered in the City of Apache Junction.	Recommended on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	City of Apache Junction

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
<p>59. Dust control manager required at construction and soil and rock excavation sites of five or more acres in Area A (current threshold for earthmoving permits), ARS 49-459.</p> <p>59. Require dust coordinators at earthmoving sites of 5-50 acres - This measure would require an onsite dust control coordinator to be present on sites of 5 to 50 acres during active soil and rock excavation, soil and rock removal, and construction operations, including road construction operations, and related transport activities at access points to paved or unpaved roads. This person could also perform other tasks, but this person would be responsible for managing dust prevention and control on the site.</p>	<p>Replaced by new Measure #59 on March 9 (below)</p> <p>Recommended on March 9</p>	<p>Measure was received too late to be evaluated</p> <p>Measure was received too late to be evaluated</p>	<p>Measure was received too late to be evaluated</p> <p>Measure was received too late to be evaluated</p>	<p>Measure was received too late to be evaluated</p> <p>Measure was received too late to be evaluated</p>	<p>Measure was received too late to be evaluated</p> <p>Measure was received too late to be evaluated</p>	<p>State, counties</p> <p>County</p>
General						
60. Expand Area A (ARS 49-541(A))	Withdrawn on March 9 due to limited impact on PM-10	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
Nonroad Activities						
61. Ban leaf blower from blowing debris into streets - This measure would ban leaf blowers from blowing debris into the streets in <i>Maricopa County</i> .	Recommended on March 6 with change shown in italics	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County
62. Require cities, towns and the counties in Area A to require leaf blowers rented from facilities to provide an educational piece on reducing particulate matter.	Replaced by new Measure #62 on March 9 (below)	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts
62. Implement a leaf blower outreach program - This measure would involve the development and distribution of educational materials on reducing leaf blower dust and would require that the private sector provide the printed materials to customers who purchase or rent leaf blowers.	Recommended on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	County, private sector

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
63. Require cities, towns and the counties in Area A to ban all-terrain and off-highway vehicles by the public on state lands located within the jurisdiction of the city, town or county (AGC)	Not Recommended on March 6 due to lack of municipal and county jurisdiction over state lands	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts
63. Regulate and increase enforcement of ATV use on State land - This measure would require the State to regulate and increase enforcement of all-terrain and off-highway vehicle use on State lands located in Area A.	Substitute Measure #63 Recommended on March 6	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State
76. Ban A TV use on high pollution days - This measure would ban ATV use on High Pollution Advisory days in Area A.	Recommended on March 6 as a new measure	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State
Paved Roads						
64. Require cities, towns and the counties in Area A to sweep paved roads.	Not Recommended on March 9 due to duplication of Measure #29	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
Unpaved Surfaces						
65. Require cities, towns and the counties in Area A to stabilize unpaved roads and shoulders.	Not Recommended on March 9 due to duplication of Measures #33 and #36	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts
66. Require cities, towns and the counties in Area A to adopt an ordinance that requires property owners to stabilize unpaved parking lots.	Not Recommended on March 9 due to duplication of Measure #32	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
67. Create particulate mitigation fund with air quality fines used to pave and stabilize land surfaces in and around high pollution areas in Area A.	Replaced by new Measure #67 on March 9 (below)	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts
67. Create a fund for paving and stabilizing in high pollution areas - This measure would create a particulate mitigation fund to pave and stabilize land surfaces in and around high pollution areas - establish a grant program for private businesses to stabilize and pave - direct fine monies from Maricopa County for stabilization efforts	Recommended on March 9 with changes shown	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County, private sector
68. Establish a grant program for private businesses to stabilize and pave around monitors (Home Builders)	Combined with Measure #67 on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County
69. Direct fine monies from Maricopa County for stabilization efforts (Home Builders)	Combined with Measure #67 on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
70. In areas of high PM-10 emissions density, require paving of: - unpaved roads (including haul roads) - unpaved access points - unpaved parking and vehicle maneuvering areas	Withdrawn due to duplication of other recommended measures	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County, local govts
Vacant Lots						
71. Give cities, towns and counties in Area A the authority to stabilize vacant lots when an owner fails to do so.	Not Recommended due to same concerns as Measure #41	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts
72. Give cities, towns and the counties in Area A the authority to recoup expenses from a property owner and allow cities, towns and counties in Area A lien authority on property where the city, town or county has stabilized.	Not Recommended due to same concerns as Measure #41	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, counties, local govts

MEASURE	AIR QUALITY TECHNICAL ADVISORY COMMITTEE RECOMMENDATION	COST-EFFECTIVENESS OF PM-10 EMISSIONS REDUCED (BASIS FOR CALCULATION)	FIVE PERCENT EMISSIONS REDUCTION TARGET = 4,594 TONS OF PM-10 PER YEAR (% OF TARGET)	MODELING ATTAINMENT AT THE SALT RIVER AREA AND HIGLEY MONITORS ON THE HIGHEST PM-10 DAYS IN 2005/2006	ATTAINING PM-10 STANDARD AT ALL MONITORS IN THE NONATTAINMENT AREA IN 2007, 2008 AND 2009	POTENTIAL IMPLEMENTING ENTITY
Woodburning						
73. No burn restriction on PM-10 high pollution advisory days (right now, it's CO only), ARS 11-871.	Withdrawn on March 9, since no burn restrictions already apply on PM-10 HPA days	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County
74. No burn restriction applied to outdoor hospitality fires and chimneas on PM-10 high pollution advisory days, ARS 49-501 (F).	Not Recommended on March 9 due to duplication of Measure #46	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County
General.						
75. Create a dedicated funding source for the Maricopa County Air Program - This measure would create a dedicated funding source for the County Air Program to support increased enforcement of Rule 310.01, and other air programs, as necessary. Example: Restore In-Lieu funding or some other fee to emissions testing or other approach.	Recommended as a new measure on March 9	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	Measure was received too late to be evaluated	State, County

March 7, 2007

Prospective ozone precursor control measures by ADEQ

1. Ban on Open Burning during Ozone Season
2. Expand Area A
3. Liquid Leaker Test

1. Control Measure: Ban on Open Burning during Ozone Season

Target pollutants: PM₁₀, PM_{2.5}, NO_x, VOC

Description:

This control measure prohibits open burning – all outdoor fires --from May 1 through September 30 each year in Area A.

Emissions Benefits:

Potential Emission Reductions from Ban on Open Burning (tons/year)					
Region	PM ₁₀	PM _{2.5}	NO _x	VOC	CO
Area A	13	13	4	8	--

Emissions Benefit Calculation Method:

This type of burning tends to be conducted by farmers and land clearers and occurs most in a summer and winter season. The annual emissions from the Maricopa County Emissions Inventory were divided in two and the summer emissions were zeroed out, reducing the emissions in this category by one half.

Control Measure: Liquid Leaker Test

Target pollutants: VOCs

Description:

Vehicles leaking gasoline are gross emitters of volatile organic compounds. Fuel leaks are relatively easy to identify. This measure would add an under-hood check for gasoline leaks to vehicle emissions inspections in Areas A and B.

Legislative Language:

ARS §49-542. Emissions inspection program; powers and duties of director; administration; periodic inspection; minimum standards and rules; exceptions

...

D. A vehicle shall not be registered or reregistered until such vehicle has passed the emissions inspection and the tampering AND LIQUID FUEL LEAK INSPECTIONS PRESCRIBED IN SUBSECTIONS G AND Y of this section or has been issued a certificate of waiver. A certificate of waiver shall only be issued one time to a vehicle after January 1, 1997. If any vehicle to be registered or reregistered is being sold by a dealer licensed to sell motor vehicles pursuant to title 28, the cost of any inspection and any repairs necessary to pass the inspection shall be borne by the dealer. A dealer who is licensed to sell motor vehicles pursuant to title 28 and whose place of business is located in area A or area B shall not deliver any vehicle to the retail purchaser until the vehicle passes any inspection required by this article or the vehicle is exempt under subsection J of this section.

...

F. The director shall adopt minimum emissions standards pursuant to section 49-447 with which the various classes of vehicles shall be required to comply as follows:

1. For the purpose of determining compliance with minimum emissions standards in area B:

(a) A motor vehicle manufactured in or before the 1980 model year, other than a diesel powered vehicle, shall be required to take and pass the curb idle test condition. A diesel powered vehicle is subject to only a loaded test condition. The conditioning mode shall, at the option of the vehicle owner or owner's agent, be administered only after the vehicle has failed the curb idle test condition. Upon completion of such conditioning mode, a vehicle that has failed the curb idle test condition may be retested in the curb idle test condition. If the vehicle passes such retest, it shall be deemed in compliance with minimum emissions standards unless the vehicle fails the tampering AND LIQUID FUEL LEAK INSPECTIONS PURSUANT TO SUBSECTIONS G AND Y of this section.

...

AA. IN ADDITION TO AN EMISSIONS INSPECTION, A VEHICLE IS SUBJECT TO A LIQUID FUEL LEAK INSPECTION ON AT LEAST A BIENNIAL BASIS IF THE VEHICLE WAS MANUFACTURED AFTER THE 1974 MODEL YEAR AND IS NOT A DIESEL VEHICLE. THE DIRECTOR SHALL ADOPT RULES PRESCRIBING PROCEDURES AND STANDARDS FOR THE LIQUID FUEL LEAK INSPECTION.

...

Emissions Benefits:

Potential Emission Reductions From Liquid Leaker Test (tons/year)					
Region	PM₁₀	PM_{2.5}	NO_x	VOC	CO
Area A				3,595	
Area B				1,463	

Emissions Benefit Calculation Method:

Through several vehicle testing programs in the late 1990s and early 2000s, EPA gathered enough information to characterize the excess volatile organic compound (VOC) emissions from vehicles with liquid leaks and to determine the frequency of these vehicles in the overall metropolitan fleets. These statistics were assembled for liquid leaking vehicles whose emissions would be found in the diurnal cycle, in the resting loss mode, in the hot soak mode, and in the running loss mode. This information was applied to the emission characteristics and vehicle fleet and vehicle miles traveled (VMT) of Areas A and B. The primary assumption, for which there were no performance statistics from EPA, is that conducting an inspection for liquid leaks would be 80% effective.

Control Measure: Expand Area A and Area B

Target pollutants: NO_x, VOC, CO

Description:

This measure expands the vehicle emissions inspections areas in greater Phoenix (Area A) and Tucson (Area B), to address air pollution impacts from unprecedented growth that has already occurred, and from platted and expected growth, in a timely manner. Compliance is low with the existing requirement in A.R.S. §49-542.A. that vehicles registered outside of Area A or B used to commute to the driver's principal place of employment located within Area A or B must be inspected. Expansion of Area A and B would achieve real emission reductions that could also be easily tracked for credit in plans submitted to EPA. Expansion would cover the Wickenburg area, most of the developable area in northern Pinal County and the I-10 corridor from Casa Grande to Marana, and the I-19 corridor to just south of the community of Continental. Expansion of these areas affects other pollution control programs, including

- Cleaner Burning Gasoline (Area A)
- Oxygenated fuels (Area B)
- Stage II Vapor Recovery (Area A)
- Alternative fuels for government fleets (Area A)
- Major employer Travel Reduction Program (Area A)
- Residential fireplace no-burn days (Area A)

Legislative Language:

ARS §49-541. Definitions

In this article, unless the context otherwise requires:

1. "Area A" means the area delineated as follows:

(a) In Maricopa county:

Township 8 north, range 2 east and range 3 east

Township 7 north, range 2 west through range 5 east

Township 6 north, range 5 west through range 6 east

Township 5 north, range 5 west through range 7 east

Township 4 north, range 5 west through range 8 east

Township 3 north, range 5 west through range 8 east

Township 2 north, range 5 west through range 8 east

Township 1 north, range 5 west through range 7 east

Township 1 south, range 5 west through range 7 east

Township 2 south, range 5 west through range 7 east

Township 3 south, range 5 west through range 1 east

Township 4 south, range 5 west through range 1 east

TOWNSHIP 8 NORTH, RANGE 4 WEST THROUGH 7 WEST, THAT PORTION WITHIN MARICOPA COUNTY

TOWNSHIP 7 NORTH, RANGE 3 WEST AND 4 WEST, THAT PORTION WITHIN MARICOPA COUNTY

TOWNSHIP 7 NORTH, RANGE 5 WEST THROUGH 7 WEST

TOWNSHIP 6 NORTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 5 NORTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 4 NORTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 3 NORTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 2 NORTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 1 NORTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 1 SOUTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 2 SOUTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 3 SOUTH, RANGE 6 WEST AND RANGE 7 WEST

TOWNSHIP 4 SOUTH, RANGE 6 WEST AND RANGE 7 WEST

(b) In Pinal county:

Township 1 north, range 8 east and range 9 east

Township 1 south, range 8 east and range 9 east

Township 2 south, range 8 east and range 9 east

Township 3 south, range 7 east through range 9 east

TOWNSHIP 1 NORTH, RANGE 10 EAST

TOWNSHIP 1 SOUTH, RANGE 10 EAST
TOWNSHIP 2 SOUTH, RANGE 10 EAST
TOWNSHIP 3 SOUTH, RANGE 10 EAST
TOWNSHIP 4 SOUTH, RANGE 2 EAST THROUGH RANGE 4 EAST
TOWNSHIP 4 SOUTH, RANGE 8 EAST THROUGH RANGE 10 EAST
TOWNSHIP 5 SOUTH, RANGE 2 EAST THROUGH RANGE 10 EAST
TOWNSHIP 6 SOUTH, RANGE 2 EAST THROUGH RANGE 10 EAST
TOWNSHIP 7 SOUTH, RANGE 3 EAST THROUGH RANGE 10 EAST
TOWNSHIP 8 SOUTH, RANGE 6 EAST THROUGH RANGE 10 EAST
TOWNSHIP 9 SOUTH, RANGE 6 EAST THROUGH RANGE 8 EAST

(c) In Yavapai county:

Township 7 north, range 1 east and range 1 west through range 2 west

Township 6 north, range 1 east and range 1 west

TOWNSHIP 8 NORTH, RANGE 4 WEST THROUGH RANGE 7 WEST, THAT PORTION WITHIN YAVAPAI COUNTY

TOWNSHIP 7 NORTH, RANGE 3 WEST AND RANGE 4 WEST, THAT PORTION WITHIN YAVAPAI COUNTY

2. "Area B" means the area delineated as follows:

(a) In Pima county: ~~as township~~

TOWNSHIPS 11 and 12 south, range 12 through RANGE 14 east; ~~township~~

Townships 13 through 15 south, range 11 through RANGE 16 east;

Township 16 south, range 12 through RANGE 16 east, excluding any portion of the Coronado national forest and the Saguaro national park.

TOWNSHIP 11 SOUTH, RANGE 10 EAST AND 11 EAST

TOWNSHIP 12 SOUTH, RANGE 10 EAST AND 11 EAST

TOWNSHIP 15 SOUTH, RANGE 17 EAST, EXCLUDING THAT PORTION WITHIN THE SAGUARO NATIONAL PARK (EAST)

TOWNSHIP 16 SOUTH, RANGE 17 EAST

TOWNSHIP 17 SOUTH, RANGE 13 EAST THROUGH RANGE 17 EAST

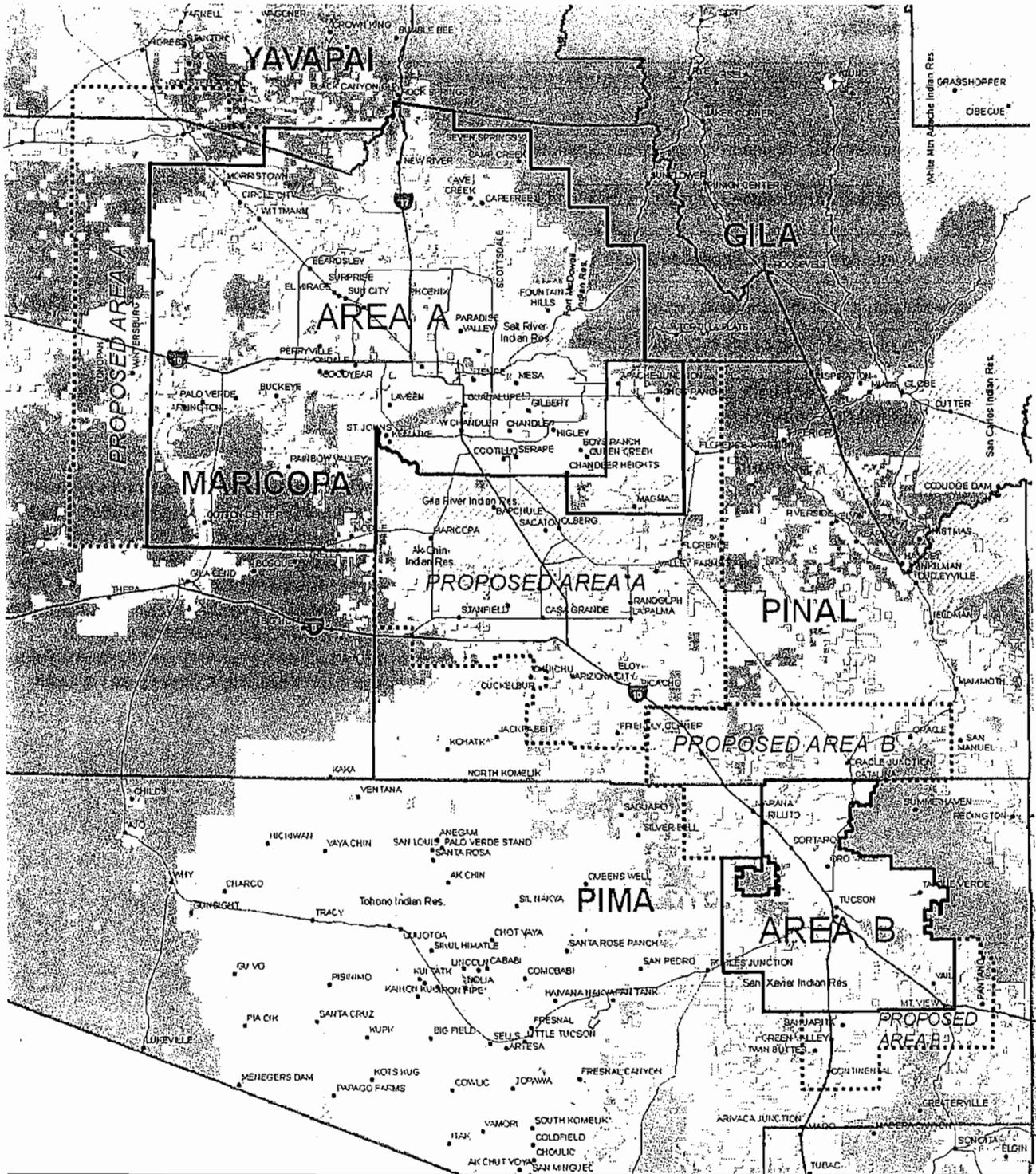
TOWNSHIP 18 SOUTH, RANGE 13 EAST AND RANGE 14 EAST

(B) IN PINAL COUNTY:

TOWNSHIP 9 SOUTH, RANGE 9 EAST THROUGH RANGE 16 EAST

TOWNSHIP 10 SOUTH, RANGE 9 EAST THROUGH RANGE 16 EAST

The map on the following page shows the boundaries of Expanded Area A and Area B



Legend

- Area A and B-2001 to Present
- Proposed Area A & B Expansion

Land Ownership

- Government
- Indian Res.
- Other
- Private
- State Trust

Strawman Areas A and B Expansion And Arizona Land Ownership



Emissions Benefits:

Potential Emission Reductions from Expanding Area A and Area B (tons/year)					
Region	PM ₁₀	PM _{2.5}	NO _x	VOC	CO
Extend Inspection Maintenance Program into Expanded Area A*	>0	>0	329	2,090	24,147
Extend Inspection Maintenance Program into Expanded Area B*	>0	>0	115	494	4,270
Winter oxygenated Fuels in Expanded Area B	--	--		2	34
Cleaner Burning Gas in Expanded Area A	4	4	5,525	8,640	72,007
Expansion of Stage II vapor recovery into Expanded Area A	--	--	--	259	--

*Emissions inspections of both gasoline and diesel vehicles have particulate matter emissions benefits, but there is not a reliable method of quantifying those benefits.

Emissions Benefit Calculation Method:

The general method for these five different measures was to first calculate what emissions were occurring in present areas A and B from the inspected vehicle fleet, from the winter oxy fuels, from the Cleaner Burning Gasoline (Area A only), and from Stage II vapor recovery (Area A only). Then, the same calculations were applied to the expanded areas with no additional controls. Third, the percentage reductions from the various measures were applied to the "base case" emissions in the expanded areas to obtain the tonnage reductions. Information utilized in this work included the EPA's vehicular emission model called "MOBILE6.2", county vehicle registration distributions by model year, population data for towns in the expanded areas, estimates of Cleaner Burning Gasoline benefits from ADEQ contractor reports, gasoline station location and throughput data from Arizona Department of Weights and Measures permit information and ADOT fuels sales data, and control effectiveness of the State II equipment from Maricopa County surveys and engineering estimates.

EXISTING AREA A MEASURES

- Emissions Inspection Program - A.R.S. 49-542
- Traffic Synchronization - A.R.S. 49-474.01, 9-500.04
- Plans to Stabilize Targeted Unpaved Roads, Alleys, and Stabilize Unpaved Shoulders on Targeted Arterials - A.R.S. 49-474.01, 9-500.04
- Crack Seal Equipment - A.R.S. 49-474.01, 9-500.04
- Adjusted Work Hours for at Least Eighty-Five Percent of County Employees Beginning October 1 and Ending April 1 - A.R.S. 49-474.01, 9-500.04
- Travel Reduction Program - A.R.S. 49-474.01, 49-581 et. seq.
- Alternative Fuel Public Vehicle Fleet Plans - A.R.S. 49-474.01, 9-500.04, 15-349
- Alternative Fuel Vehicle Requirements for Local Governments and School Districts - A.R.S. 49-474.01, 9-500.04, 15-349
- Voluntary Compliance with Tier 2 or Tier 3 for Nonroad Equipment - A.R.S. 49-558
- Voluntary Implementation of Ultra Low Sulfur Diesel Fuel - A.R.S. 49-558.01
- Adjusted Work Hours - A.R.S. 49-454
- Parking Prohibitions for Municipal Employees not Participating in the VEI Program - A.R.S. 49-552
- Voluntary Vehicle Repair and Retrofit Program - A.R.S. 49-474.03
- Clean Burning Fireplace Ordinance - A.R.S. 11-875, 9-500.16
- Residential Wood Burning Restrictions - A.R.S. 11-871
- Engine Idling Restrictions - A.R.S. 11-876
- Use of Petroleum Products for Road Maintenance - A.R.S. 28-6705
- Catalytic Converter Replacement Program - A.R.S. 49-474.03
- Tougher Enforcement of Vehicle Registration and Emissions Test Compliance - A.R.S. 49-552, 49-557, 49-550
- Retirement of Pre-1988 Heavy Duty Diesel Engines Before 2004 - A.R.S. 49-542
- Winter Fuel Reformulation: California Phase 2 Reformulated Gasoline with 3.5 Percent Oxygen Content by Weight - A.R.S. 41-2083, 41-2123, 41-2124
- Remote Sensing - A.R.S. 49-542.07
- Stage I and II Vapor Recovery - A.R.S. 41-2132
- Use of On-Road Diesel Fuel for Off-Road Engines - A.R.S. 49-542.04
- Roadside Testing for Diesel Vehicles - A.R.S. 49-542.06
- Diesel Vehicle Low Emissions Incentive Grants - A.R.S. 49-551.01

Analysis of Particulate Control Measure Cost Effectiveness

April 18, 2007



Report No. SR2007-04-03

Analysis of Particulate Control Measure Cost Effectiveness

prepared for:

Maricopa Association of Governments

April 18, 2007

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Analysis of Particulate Control Measure Cost Effectiveness

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EXECUTIVE SUMMARY

Despite the implementation of some of the most stringent control measures in the country, a portion of Maricopa County continues to violate the national ambient air quality standards (NAAQS) for fine particulate matter (PM₁₀). As the designated air quality regional planning agency for Maricopa County, the Maricopa Association of Governments (MAG) is responsible for preparing State Implementation Plan (SIP) revisions demonstrating attainment of the NAAQS. In July 2002, EPA approved the most recent Maricopa County SIP submission demonstrating attainment of the ambient PM₁₀ standard. At that time EPA granted the request for an extension of the date for attaining the PM₁₀ standards to December 31, 2006.

Subsequent to that approval, several monitors continued to record exceedances of the 24-hour PM₁₀ standard. As a result of exceedances recorded in 2004, 2005 and 2006 at six monitoring sites, the nonattainment area was unable to attain the PM₁₀ standards by the December 31, 2006 deadline.

For areas that fail to attain the PM₁₀ standard by the applicable attainment date, section 189(d) of the Clean Air Act requires that a Five Percent Plan for PM₁₀ be submitted to EPA within one year of the attainment date. MAG must therefore submit a new PM₁₀ attainment plan to EPA by December 31, 2007. That plan must show reductions in PM₁₀ emissions of five percent per year until attainment is reached at all monitors.

To address this requirement, MAG commissioned a study to prepare descriptions of a preliminary list of PM₁₀ control measures for use by MAG's Air Quality Technical Advisory Committee (TAC) in recommending a Suggested List of Measures for the Five Percent Plan for PM₁₀. A total of 46 separate control measures were addressed in the study. For each measure the following information was prepared:

- Narrative description;
- Suggested implementing agency;
- An estimate of the cost of implementation;
- An estimate of the PM₁₀ emission reduction potential;
- An estimate of the cost effectiveness (\$/ton of PM₁₀ reduced); and
- A discussion of implementation issues and comments.

To support the preparation of this information, contacts were established with other serious area PM₁₀ nonattainment areas, including Clark County, Nevada, San Joaquin Valley and the South Coast Air Quality Management District to assess their experience with individual control measures. Reviews of relevant dust control literature were also performed to obtain data on measured emission reductions. Contacts were established

with local agencies and businesses to determine the cost of labor, equipment, materials, etc., located in Maricopa County. The recently released 2005 PM₁₀ emission inventory* was reviewed to ensure that emission estimates of control measure benefits were computed in a manner that is consistent with methods used to estimate source specific emissions. Detailed spreadsheets were prepared to document the sources of information, assumptions and methods used to prepare estimates of emission benefits, costs and cost effectiveness for each control measure.

Table 1 provides a summary of the cost effectiveness estimates prepared for each of the control measures. The measures are ranked on the basis of their cost effectiveness from the lowest to the highest. One of the measures, #25 Encourage Use of Leaf Vacuums to Replace Blowers was found to have no PM₁₀ emissions benefit. Due to uncertainty in available estimates or alternate options for control, a range of cost effectiveness was computed for several control measures. For these measures, the midpoint in the range of cost effectiveness estimates was used to establish their ranking. Insufficient information is available to quantify the costs and benefits of several control measures and they are listed as unknown. Also listed in the table are notes on the degree of confidence in the listed estimate (L for low, M for medium and H for high) and the emission source category that would be impacted by the measure.

A summary of the information prepared for each control measure follows Table 1.

* 2005 Periodic Emissions Inventory for PM₁₀ for the Maricopa County, Arizona, Nonattainment Area, Public Review Draft, January 23, 2007.

Table 1
PM₁₀ Control Measures Ranked by Increasing Cost Effectiveness

Measure No.	Measure	Cost-Effectiveness (\$/ ton of PM ₁₀)	Degree of Confidence in Ranking	PM ₁₀ Emissions Category Impacted by the Measure
29	PM-10 Certified Street Sweepers	\$4	M	Paved Road Dust
22	Model Cumulative Impacts	\$141	M	Industry
33	Pave or Stabilize Existing Dirt Roads & Alleys	\$141	M	Unpaved Roads
26	Reduce Off-Road Vehicle Use	\$230	H	Off-Road Vehicle Dust
5	Dedicated Coordinator for Unpaved Roads/Vacant Lots	\$534	M	Unpaved Rds+Vacant Lots
34	Limit Speeds to 15 mph on Dirt Roads	\$899	H	Unpaved Roads
35	Prohibit New Dirt Roads and Lot Splits	\$2,646	H	Unpaved Roads
1	Public Education & Outreach	\$7,898	M	Construction
40	Enhanced Enforcement of Trespass Ordinances & Codes	\$7,961	L	Vacant Lots
3	Core Dust Control Training Program	\$9,990	M	Construction
8	Certification Program for Dust-Free Developments	\$10,752	M	Construction
15	Conduct Nighttime Inspections	\$10,752	M	Construction + Industry
23	Conduct Nighttime and Weekend Inspections	\$10,752	M	Construction + Industry
2	Extensive Dust Control Training Program	\$12,494	M	Construction
4	Dust Managers at Large Construction Sites	\$14,285	M	Construction
28	Require Ultra-Low Sulfur Diesel for Nonroad Equipment	\$16,000	H	Nonroad Exhaust
9	Better-Defined Rule 310 Tarping Requirements	\$16,085	M	Construction
36	Pave or Stabilize Unpaved Shoulders	\$18,452	M	Unpaved Shoulders
32	Pave or Stabilize Existing Unpaved Parking Lots	\$21,162	M	Unpaved Parking Lots
11	Self-Monitoring for Sources Over 50 Acres	\$21,530	M	Construction + Industry
24	Ban or Discourage Leaf Blowers on HPA Days	\$21,851	H	Leaf Blower Dust
39	Restrict Vehicular Use & Parking on Vacant Lots	\$30,706	L	Vacant Lots
41	Vacant Lots Stabilized by County if Owners Do Not Respond	\$31,367	L	Vacant Lots
38	Increase Enforcement of Rule 310.01 for Vacant Lots	\$31,814	L	Vacant Lots
19	Fully Implement Rule 316	\$32,276	M	Industry
27	Incentives for Nonroad Diesel Engine Retrofits	\$48,000	H	Nonroad Exhaust
12	Mobile Monitoring to Measure PM-10 and Issue NOVs	\$54,233	M	Construction + Industry
16	Increase Inspection Frequency for Permitted Facilities	\$65,765	M	Industry
17	Increase Inspections in Highest PM-10 Density Areas	\$65,899	M	Industry
6	Strengthen Stringency & Enforcement of Trackout Provisions	\$67,653	L	Paved Road Dust
30	Retrofit Onroad Diesel Engines	\$120,000	H	Onroad Mobile
18	Notify Violators More Rapidly to Promote Immediate Compliance	\$122,575	NA	Construction + Industry
46	Restrict Use of Outdoor Fireplaces & Pits	\$161,000	H	Woodburning
37	Pave or Stabilize Unpaved Access to Paved Roads	\$168,025	M	Paved Road Dust
14	Maintenance Requirements for Paved Roads & Parking Lots	\$320,444	H	Industry
20	Use PM-10 Certified Sweepers on Private Paved Areas	\$320,444	H	Industry
31	Repave or Overlay Paved Roads with Rubberized Asphalt	\$2,460,441	H	Paved Roads - Tire Wear
25	Encourage Use of Leaf Vacuums to Replace Blowers	NA	H	Leaf Blower Dust
7	Increase Fines for Dust Control Violations & Publish Violators List	Unknown	NA	Construction + Industry
10	Conduct Just-In-Time Grading	Unknown	NA	Construction
13	Cease Dust Generation Activities During Stagnation Conditions	Unknown	NA	Construction + Industry
21	Shift Hours of Operation During Stagnant Conditions Nov-Feb	Unknown	NA	Industry
42	Schedule Improvements on Streets to Retain Alternate Routes	Unknown	NA	Onroad Mobile
43	Build Park and Ride Lots Earlier	Unknown	NA	Onroad Mobile
44	Coordinate Public Transit Services with Pinal County	Unknown	NA	Onroad Mobile
45	Increase Fines for Open Burning (Currently \$25)	Unknown	NA	Woodburning

1. PUBLIC EDUCATION AND OUTREACH (e.g., CLARK COUNTY) WITH ASSISTANCE FROM LOCAL GOVERNMENTS

In January 2007, the Maricopa County Board of Supervisors launched the Bring Back Blue clean air initiative, which is a comprehensive outreach program designed to educate the public on the health effects and sources of particulate matter emissions and reduce the PM₁₀ emissions in Maricopa County. After meeting with stakeholders (including Arizona Department of Environmental Quality [ADEQ], Maricopa Association of Governments [MAG], and health organizations), conducting market research, and receiving public input, an extensive media campaign was developed, which includes television, radio and print ads, billboards, brochures, posters, and a program website (www.bringbackblue.org). The campaign aims to curtail activities that contribute to the PM₁₀ inventory in the area by asking the public, among others, to reduce vehicle travel, avoid driving on dirt roads, avoid use of dust blowing and PM₁₀-emitting gardening equipment, reduce outdoor burning activities, and conserve electricity. The 2007 budget for the Bring Back Blue initiative is set at \$1.025 million.

Similar programs have been implemented in other areas in the country. In Las Vegas, NV, the O-eliminate Ozone program and Dust Campaign involve an annual budget of about \$1 million to cover, among others, TV, radio and newspaper ads, billboards, school programs, educational public events throughout the year, and full-time program coordinators. In Sacramento, CA, the Spare the Air program is aimed at educating the public and reducing vehicle travel, along with associated emissions, during days with forecasted high ozone levels. During the 2006 ozone season (six warmer months), the Spare the Air program budget of over \$500,000 included the cost for TV and radio airtime for alerts during forecasted high-ozone days, TV and radio commercials, and processing of air quality monitoring and meteorological data to create forecasts for upcoming days.

Suggested Implementing Entity

This program is being coordinated by the Maricopa County Air Quality Department.

Cost

Based on consultation with Clark County, NV, which has a similar public outreach campaign, the Bring Back Blue initiative was approved with a 2007 budget of about

\$1.025 million. The budget covers the cost for the media campaign, public outreach, and additional program development (i.e., additional promotional material, further public outreach, and other media expansions).

Emission Reduction

Because the Bring Back Blue campaign is new in Maricopa County, direct estimates of the associated PM₁₀ emission benefits are not available. Vehicle trip reduction estimates are available from a similar outreach program in Sacramento, CA, the Spare the Air program, which is designed to control emissions of ozone precursors during days with forecasted high ozone levels.

Averaged over the last seven ozone seasons, public surveys revealed that about 1.8% of drivers purposefully reduced their driving due to the Spare the Air campaign in Sacramento. In addition, each driver reduced his or her driving an average of 2.8 trips per day. Assuming an average trip length of about 10 miles (based on U.S. DOT Travel Trends), the VMT reduction due to the Spare the Air program amounts to about 1.4% of the total VMT in the Sacramento region. Although the Sacramento and Maricopa County programs have similar costs on a per-day basis, the target number of PM₁₀ nonattainment area households for the Bring Back Blue campaign is more than 2.5 times higher than the Sacramento region. Therefore, adjusting the reduction by the ratio of the program's cost per target area household, the Maricopa County daily VMT is projected to be reduced by about 0.5% due to the Bring Back Blue program in 2007, which is equivalent to about 0.36 tons of PM₁₀ per day from vehicle exhaust and re-entrained dust from paved and unpaved roads. This represents a conservative estimate, as reductions from other PM₁₀ sources addressed by the campaign—such as gardening equipment, electricity use, and outdoor burning activities—are not included.

Cost Effectiveness

Using the projected 2007 benefit of 0.36 tons of PM₁₀ per day and the daily program cost of \$2,808, the estimated cost-effectiveness ratio is \$7,898/ton of PM₁₀.

Implementation Issues/Comments

Compliance with this measure is voluntary, so credit taken for this measure could be subject to EPA limitations.*

* EPA memorandum from Richard Wilson (10/24/1997) established credit limits for Voluntary Mobile Source Emission Reduction Programs (VMEPs) of 3% total projected future year emission reductions required to attain the appropriate NAAQS.

2. EXTENSIVE DUST CONTROL TRAINING PROGRAM (e.g., CLARK COUNTY)

The Maricopa County Air Quality Department is currently offering two types of training classes: (1) Dust Control Application, and (2) Rule 310 Dust Training. The first explains how to properly fill out dust control applications and is offered 10 times per year. The second provides guidance to help keep businesses in compliance with the requirements of Rule 310 and is offered 11 times per year. Attendance is voluntary. No direct credit is claimed in the Maricopa County emissions inventory for the conduct of these courses; however, the benefits are theoretically captured in the overall estimate of Rule Effectiveness.

Clark County offers dust control training to local contractors and other major sources of PM₁₀ emissions to familiarize them with air quality regulations, the most effective ways to reduce PM₁₀ emissions, and air pollution health effects. Upon completing the course and passing an examination, each participant is issued a Certificate of Completion (i.e. a dust card). The courses are offered weekly at Clark County facilities and frequently presented offsite to employees of individual companies. All onsite supervisors and foremen are required to have a dust card. The Certificate is valid for a period of three years, after which a refresher course is required for recertification. The course is not free—the cost of the training is recovered through a nominal fee of \$35. Discussions with Clark County's Department of Air Quality and Environmental Management (DAQEM) indicated that over 20,000 people have completed the training course since it was instituted in 1998.

This measure would adopt a more extensive dust training program, like the one currently being offered by Clark County.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

In evaluating the cost of this measure, we assumed that all construction supervisors and foremen would complete a 4-hour dust control training class. The key change in behavior resulting from the class would be an increase in the frequency of on-site watering. The combined cost of class attendance and increased watering frequency on a 50-acre construction site was estimated to cost \$839/day. For a six-month construction project, the total cost would be \$111,670.

Emission Reduction

Emission benefits were computed using the WRAP fugitive dust handbook and assuming a baseline 50% control efficiency as reported in the recently completed Rule Effectiveness Study. The analysis assumed that the benefit of this measure would be to operate an additional water truck full-time on site to further control fugitive dust emissions. This assumption produced an increase in control efficiency to 70% and an emission reduction of 8.9 tons of PM₁₀ per 50-acre project. This translates into a daily reduction of 135 lbs/day of PM₁₀.

Cost Effectiveness

The overall cost-effectiveness is estimated to be \$6.25/lb or \$12,494 per ton of PM₁₀ reduced. Since a typical residential construction project is estimated to run for six months, the training costs are distributed over six projects over the 3-year life of the training class certificate.

Implementation Issues/Comments

This analysis assumed that Maricopa County would be reimbursed by attendees for the cost of the course. No additional enforcement effort was assumed to ensure that supervisors and foremen comply with the training requirements.

3. CORE DUST CONTROL TRAINING PROGRAM WITH VIDEO PROVIDED TO LOCAL GOVERNMENTS AND PRIVATE SECTOR

The Maricopa County Air Quality Department is currently offering two types of training classes: (1) Dust Control Application, and (2) Rule 310 Dust Training. The first explains how to properly fill out dust control applications and is offered 10 times per year. The second provides guidance to help keep businesses in compliance with the requirements of Rule 310 and is offered 11 times per year. Attendance is voluntary. No direct credit is claimed in the Maricopa County emissions inventory for the conduct of these courses; however, the benefits are theoretically captured in the overall estimate of Rule Effectiveness.

As described in Measure #2, Clark County has implemented a more extensive dust control training program. One element of that program includes distributing video recordings of the course to broaden the number of people exposed to dust control education within the community. Due to the length of the course, which is several hours, the video presents a shortened version and excludes certain segments (including the exam).

This measure would develop a set of training materials, including videos, manuals, forms, tests, etc., that constitute a core training program. These materials could then be used to “train the trainer” so that individual cities and towns could extend the reach of the existing training program.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

The cost of producing the “core” training materials is estimated to be \$100,000. No additional staff time is assumed to implement the program. The key change in behavior resulting from the training would be an increase in the frequency of on-site watering. The primary cost of increased compliance is assumed to be the operation of an additional watering truck on a half-time basis. The combined cost of the video and increased watering frequency on a 50-acre construction site was estimated to cost \$420/day. For a six-month construction project, the total cost would be \$55,782.

Emission Reduction

Emission benefits were computed using the WRAP fugitive dust handbook and assuming a baseline 50% control efficiency as reported in the recently completed Rule Effectiveness Study. The analysis assumed that the benefit of this measure would be to operate an additional water truck half time on site to further control fugitive dust emissions. This assumption produced an increase in control efficiency to 62% and an emission reduction of 5.6 tons of PM₁₀ per 50-acre project. This translates into a daily reduction of 84 lbs/day of PM₁₀.

Cost Effectiveness

The overall cost effectiveness is estimated to be \$4.99/lb or \$9,990 per ton of PM₁₀ reduced.

Implementation Issues/Comments

The analysis assumes that videos are distributed free of charge and that the cost of production is distributed across 1,600 project per year.*

* 2005 Periodic Emission Inventory for PM₁₀, Public Review Draft, January 23, 2007.

4. DUST MANAGERS REQUIRED AT CONSTRUCTION SITES OF 50 ACRES AND GREATER (e.g., CLARK COUNTY)

Under Rules 310, 310.01 and 316, responsibility for dust control is currently vested in either the project owner and/or operator of a dust generating operation. Their knowledge and efforts to implement controls are reflected in the current assessment of Rule Effectiveness.

Clark County requires projects having 50 or more acres of actively disturbed soil at any time to designate a full-time Dust Control Monitor. This requirement is applicable to multiple sites that are individually permitted at less than 50 acres each, if they are adjacent to one another, under common ownership, or are within a master planned community, and together they have 50 acres or more of disturbed soil. The training requirements to obtain a dust monitor card are significantly greater than those required for a dust card. Training lasts a full day and includes information on soil mechanics, water application, regulations, enforcement, etc. Applicants are required to obtain a Visual Emissions Evaluation (VEE) Certificate, so that they can measure plume opacity at the job site. The course is not free; the cost of the training is recovered through a fee of \$500 per person.

This measure would adopt the Clark County requirements for Dust Monitors for projects with 50 acres or more of actively disturbed soil.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

In evaluating the cost of this measure, we assumed that all Dust Managers would complete a day-long dust control training class and obtain a VEE. The key change in behavior resulting from the class would be an increase in the frequency of on-site watering. The analysis also assumed that the salary commanded by a Dust Manager would be 10% above the salary of a foreman or construction supervisor. The combined cost of employing a Dust Manager on a full-time basis and increasing watering frequency on a 167-acre construction site, of which 50 acres or 30% would be actively disturbed at any one time, was estimated to be \$2,865/day. For a six-month construction project, the total cost would be \$381,067.

Emission Reduction

Emission benefits were computed using the WRAP fugitive dust handbook and assuming a baseline 50% control efficiency as reported in the recently completed Rule Effectiveness Study. The analysis assumed that the benefit of this measure would be to operate an additional water truck full-time on site to further control fugitive dust emissions. This assumption produced an increase in control efficiency to 70% and an emission reduction of 26.7 tons of PM₁₀ per 167-acre project. This translates into a daily reduction of 402 lbs/day of PM₁₀.

Cost Effectiveness

The overall cost effectiveness is estimated to be \$7.14/lb or \$14,285 per ton of PM₁₀ reduced. Since a typical residential construction project is estimated to run for six months, the training costs are distributed over six projects over the three-year life of the training class certificate.

Implementation Issues/Comments

This analysis assumed that Maricopa County would be reimbursed by attendees for the cost of the course. No additional enforcement effort was assumed to ensure that Dust Managers would comply with the training requirements. While this measure is less cost effective than Measures #2 or #3, it is anticipated that compliance under this approach may in fact be higher. The reason is that a single individual with clear authority and responsibility for dust control is likely to be more effective than an approach that distributes responsibility.

5. DEDICATED ENFORCEMENT COORDINATOR FOR UNPAVED ROADS AND VACANT LOTS (e.g., CLARK COUNTY)

Maricopa County does not currently have a position dedicated to inspecting unpaved roads and vacant lots. Instead, responsibility is distributed across a staff of inspectors. Unpaved road enforcement is active, but conducted in response to complaints. Vacant lot enforcement has become proactive with inspections of literally thousands of lots in late 2006. The recently completed Rule Effectiveness Study* determined that vacant lots and open areas have a rule effectiveness of 68%. Maricopa County, however, did not include any benefit from Rule 310.01 in the estimate of 8,490 tons of PM₁₀ emitted from vehicles operating on unpaved roads. Unpaved road emissions are a significant source of PM₁₀ and are estimated to account for 9.3% of the PM₁₀ emitted within the nonattainment area in 2005. While this may be an overestimate of the emissions, the recent analysis of the effectiveness of Rule 310.01 did not address unpaved roads (the focus instead was on vacant lots), so the level of enforcement in 2005 is unclear.

Currently, Rule 310.01 requires emissions from unpaved roads (including alleys) with traffic levels exceeding 150 vehicles per day to be controlled by one of the following methods:

- Pave;
- Apply dust suppressants; or
- Uniformly apply and maintain surface gravel.

The non-paving measures are subject to stabilization and opacity limitations. Vacant lots are subject to trespass and stabilization controls within 60 days following discovery of vehicle use.

Clark County has placed substantial emphasis on controlling emissions from unpaved roads and vacant lots. Discussions with Clark County staff indicated that while no single position is dedicated to tracking activity on unpaved roads and vacant lots, a significant portion of a supervisor's time and that of related inspectors is focused on this activity. Overall, it is estimated that roughly three full-time staff positions are focused solely on unpaved roads and parking lots in Clark County.

Recognizing the significance of fugitive dust emissions from unpaved roads and vacant lots, this measure would establish a dedicated enforcement coordinator with

* Rule Effectiveness Study for Maricopa County Rules 310, 310.01 and 316, Final Draft, Kathleen Sommer, Maricopa County Air Quality Department, January 23, 2007.

responsibility for tracking activity on these facilities and enforcing Rule 310.01 requirements as appropriate.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Costs

There are two elements of cost for this measure: enforcement and palliative application. The enforcement cost includes the salary of a full-time coordinator, a dedicated vehicle, and a \$10,000/year budget for obtaining traffic counts. According to tests conducted in 1995 by MCDOT, the most cost-effective palliative is Ligno 10, which has an application cost of \$769/mile. The combined cost of enforcement and palliative application is estimated to be \$3,767 mile per year.

Emission Reduction

The MCDOT study computed a control efficiency of 21.9% compared to uncontrolled conditions when applied once per year. This measure was assumed to be applied to the higher traffic unpaved roads included in the 2005 Periodic Emission Inventory, which were assumed to have traffic levels of 120 vehicles per day. This measure was estimated to reduce fugitive dust emissions by 7.0 tons per mile per year.

Cost Effectiveness

The overall cost effectiveness of this measure is estimated to be \$0.27/lb or \$534/ton.

Implementation Issues/Comments

The MCDOT data need to be investigated more to ensure that the Ligno 10 can remain effective on higher-volume unpaved roads. Stabilizing roads will make it easier to drive faster and raise speed control and liability issues. Before this measure can be implemented, data on traffic volumes will have to be collected to identify candidate roads for stabilization.

6. STRENGTHEN STRINGENCY AND ENFORCEMENT OF THE TRACKOUT PROVISIONS OF RULE 310 AND RULE 310.01

PM₁₀ emissions are produced indirectly by soil tracked out of construction or industrial sites onto paved, publicly maintained roads. Maricopa County estimates that paved roads produced 13,783 tons or 15% of the PM₁₀ emitted annually within the nonattainment area in 2005. Research supported by MAG has confirmed that trackout is a significant source of fugitive dust within the Salt River Basin and that its contribution to monitored values could be higher than suggested by the inventory estimates.

Currently, MCAQD Rule 310 requires trackout or spillage that exceeds 50 feet in length on public roads to be removed immediately. For visible trackout that is less than 50 feet in length, Rule 310 requires removal once per day at the end of working hours. To prevent trackout, owners are currently required to implement one of the following control measures:

- Install either a grizzly or wheel wash system at each access point;
- Install a gravel pad at least 30 feet wide, 50 feet long and 6 inches deep; or
- Pave from the point of access for a centerline distance of 100 feet and width of 20 feet.

Recent analysis of Rule 310 indicates that its effectiveness is on the order of 50% and suggests that there is an opportunity for improvement. This measure would reduce the allowable trackout or spillage length by 50% and increase the frequency of inspections at locations with a history of violations.

Suggested Implementing Agency

This measure would be implemented by Maricopa County under Rule 310.

Cost

The principal cost of this measure, which will involve increased access point sweeping, will be borne by industry. A key assumption is that those facilities with high trackout rates will require frequent sweeping (assumed to be once every 2 hours or 5 times per day). To simplify the calculations, it is also assumed that each facility has only one access point. The cost of increased sweeping is estimated to be \$2,561 per access point per year. The cost of increased enforcement is estimated to be \$3,766 per access point

per year. The total per access point per year is \$6,326. The original analysis assumed that \$/mile sweeping cost provided by the County would be charged to both transit miles to the job site and miles swept. Further review determined that this approach inflated the overall cost of sweeping since brooming and washing activities of the sweeper would not be in use during transit to the job site. Therefore, the cost of sweeping is now based solely on the miles swept at the job site.

Emission Reduction

The benefit of the increased sweeping frequency was estimated by first computing the amount of material that would be dropped by 40 heavy-duty trucks exiting a facility each day. The baseline estimate assumed the access point is not currently being swept. The control scenario assumes that the access point is swept every two hours during work hours. The benefit computed for this measure is estimated to be 215 lbs of PM₁₀ per access point per year. The original analysis assumed that the length of trackout being swept was 25 feet. A review of the trackout analysis contained in the Salt River TSD showed a minimum measured trackout length of 455 feet. The analysis was revised to include this value, which significantly increased the length of road being swept and the pounds of PM₁₀ reduced per access point.

Cost Effectiveness

The cost effectiveness of this measure is estimated to be \$33.85/lb and \$67,653/ton.

Implementation Issues/Comments

The benefits of this measure are dependent on assumptions about the baseline compliance with Rule 310. This analysis assumed full compliance with Rule 310, which significantly deflates the amount of material that is tracked-out and inflates the cost effectiveness of the measure.

7. INCREASE FINES FOR DUST CONTROL VIOLATIONS AND PUBLISH LIST OF VIOLATORS

The primary goal of the Maricopa County Air Quality Department's penalty policy* is to deter future violations by recovering the economic benefit of noncompliance plus an additional deterrence amount that reflects the seriousness of the violation. The amount of a penalty determined under this policy is determined by the following factors:

- A gravity component that is dependent on the severity of a violation;
- The economic benefit of noncompliance;
- The Department's enforcement action costs; and
- Consideration of mitigating factors.

Penalties calculated using this guidance are only used in settlement negotiations. In the event that settlement is not possible and litigation is needed to achieve compliance, ARS 49-513[†] provides authority for the County Attorney to file an action in Superior Court to recover a civil penalty of "not more than" \$10,000 per day per violation.

Discussions with Maricopa County enforcement staff indicated that prior to July 2005, the County Attorney was responsible for settlement negotiations. At that time there was a backlog in uncompleted settlements that stretched back to 2003 and the penalties averaged less than \$1,000 per violation. Starting in July 2005, the Enforcement Division assumed responsibility for settlement negotiations. Since that time the backlog in settlements has dropped to a year and the average cost of a penalty has increased significantly. Current levels are approaching \$10,000 for repeat violators and a statute increase will be required to achieve the increase in fines targeted by this measure.

A monthly summary of all settlement cases and penalties assessed is currently provided on the County's website.[‡] Each monthly summary includes a description of high profile settlements and a listing of each settlement including the business name, address, location and date of the violation, due date, settlement date and amount of the settlement. This practice appears to satisfy the requirement proposed in this measure to publish a list of violators.

Industry response to the increase in average penalties assessed has assumed several forms:

* <http://www.maricopa.gov/airquality/divisions/enforcement/Default.aspx>

† <http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/49/00513.htm&Title=49&DocType=ARS>

‡ <http://www.maricopa.gov/airquality/news.aspx>

- Settlement negotiations are taking longer (the number of meetings required to reach closure has increased);
- Lawyers are frequently representing alleged violators; and
- Industry has started to hire County inspection/enforcement staff to improve their ability to comply with the dust control rule requirements.

The recently completed rule effectiveness study* calculated the following rates for each of the dust control rules:

- Rule 310 – 49% (based on an evaluation of earthmoving sources);
- Rule 310.01 – 68% (based on an evaluation of vacant lots and open areas); and
- Rule 316 – 54% (using an EPA default value because of an insufficient sample of inspected facilities).

These values were calculated using data collected in calendar year 2006, barely one year after the Enforcement Division assumed responsibility for settlement negotiations. Given that behavior change is a lagged response and it has taken time to ratchet up the average amount of penalties assessed, it is expected that the current rule effectiveness rates are higher than calculated in the recent study. A search for an elasticity measuring industry response to an increase in assessed penalties found that none exist.[†] Lacking this information it is not possible to estimate current rule effectiveness levels.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

No estimate of the cost of implementing and complying with this measure is available.

Emission Reduction

No estimate of the emissions benefits of this measure is available.

Cost Effectiveness

No estimate of the cost effectiveness of this measure is available.

* Rule Effectiveness Study for Maricopa County Rules 310, 310.01 and 316, Final Draft, prepared by Maricopa County Air Quality Department, January 23, 2007.

[†] Discussions with EPA and CARB staff confirmed that this information is not available.

Implementation Issues/Comments

Given that the average value of assessed penalties has increased and the maximum penalties assessed for repeat offenders is approaching the ARS defined limit of \$10,000 per violation per day, the governing statute, ARS 49-513 would need to be revised in order to implement the increased fines envisioned in this measure. An alternate, possibly more effective method of meeting the goals of this measure could be realized through increasing the number of inspections/year of permitted facilities and job sites. This is because the annual cost of noncompliance will increase more through an increase in the number of inspections and related settlements than it will through an increase in maximum value of the penalty levied per violation.

Discussions with Clark County staff found that increased penalties produce higher compliance rates. They too have a \$10,000 per violation per day statutory limit, but have increased penalties by noting separate violations and imposing fines for every day on which a violation occurs. In some cases, penalties have been in the range of \$200,000 - \$300,000 per NOV. Companies/individuals receiving large penalties have been more cooperative in meeting with the County to work on long-term company-wide Dust Compliance Plans in exchange for lower fines.

8. ESTABLISH A CERTIFICATION PROGRAM FOR DUST FREE DEVELOPMENTS TO SERVE AS AN INDUSTRY STANDARD

A check of the serious PM₁₀ nonattainment areas, Clark County, San Joaquin Valley and South Coast and a broader web search confirmed that this measure has not been implemented anywhere else. It represents a fundamentally different approach to reducing fugitive dust, not through regulation, but through the development of incentives (i.e., this measure offers a carrot for improved compliance not a stick). The proposed incentive would be the establishment of a certification program and related public relations campaign that provides publicity value (i.e., bragging rights) for those developments that are certified to be dust free.

Many steps would be required to implement this measure. First, criteria would need to be established that define acceptable emission levels for a dust free development. These levels would need to be negotiated with the industry. Criteria to be considered would include: dust control practices, opacity limits, equipment specifications (e.g., limits on the age and emission rate of construction equipment, fuel specifications, etc.), rule effectiveness, etc. A process for certification would need to be established and might include requirements addressing documentation, measurement/monitoring and inspection. A public awareness program would need to be created to inform the public of the benefits of developments certified as meeting these criteria.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

No estimate of the cost of implementing and complying with this measure is available. However, cost elements would include:

- Establishing a program;
- Program operation;
- Public Awareness; and
- Industry implementation of incremental control measures needed to be certified as dust free.

Emission Reduction

No estimate of the emissions benefits for this measure is available. The magnitude of the reduction will depend on the benefits of the incremental control measures that are implemented and the level of industry participation. An estimate of the potential benefits can be derived from applying the difference between the current rule effectiveness level for Rule 310 (which is 49%) and the EPA target of 80% rule effectiveness to the 2005 estimate of construction industry PM₁₀ emissions in the nonattainment area (i.e., 31% of 37,572 tons/year times an assumed control efficiency rate of 90%). The maximum potential benefit of this measure would be an unknown portion of 10,483 tons/year or 11% of the PM₁₀ emission inventory. The point of this discussion is that based on the 2005 emission inventory, measures directed at the construction industry offer significant potential for PM₁₀ emission reductions.

Cost Effectiveness

While no specific estimate of the cost effectiveness of this measure is available, an approximate estimate was prepared by quantifying the incremental amount of watering that would be required to achieve the difference between a 49% and 80% reduction in fugitive dust from a representative development (i.e., 50 acre site). Using this approach, the cost effectiveness of this measure was estimated to be \$10,752/ton of PM₁₀ reduced. This estimate, however, does not include the administrative expenses of designing and implementing the program. These costs would increase the \$/ton estimate for this measure.

Implementation Issues/Comments

Discussions should be held with industry to gauge their interest in participating in a dust free certification program before undertaking the effort required to implement this measure.

9. REVISE RULE 310 TARPING REQUIREMENTS TO INCLUDE EMPTY BACKHAUL

Materials such as sand, dirt, gravel, rock, etc. transported in uncovered trucks can be spilled onto public roadways. This material can then be pulverized by traffic, become airborne, and contribute to the paved road fugitive dust emissions (currently estimated to be 13,783 tons per year or 15% of the nonattainment area inventory in 2005).

Emissions from uncovered trucks are currently regulated under Rule 310. Section 308 requires owners and/or operators of haul trucks to meet minimum freeboard requirements, prevent spillage or loss of bulk material, cover all haul trucks with a tarp or suitable enclosure, and clean or cover the interior of a cargo compartment before any empty truck leaves the site when traveling onto paved areas accessible to the public.

This measure is designed to eliminate emissions produced during empty backhauls after a truck has dumped its load of material. Current cleaning and/or tarping practices have been found to be ineffective. This measure would require empty trucks to fully enclose the cargo compartment prior to traveling onto public roadways.

Suggested Implementing Entity

This measure would be implemented by Maricopa County.

Cost

The only cost addressed in this analysis is the labor required to thoroughly cover the empty truck bed and the extra time added to complete daily activity. No increase in enforcement effort was assumed. Vehicles were assumed to make 13 round trips per day and incur an additional cost of \$13.42 for compliance per day.

Emission Reduction

The combined emission reduction from 13 trips is estimated to be 1.67 lbs of PM₁₀ per truck day.

Cost Effectiveness

The cost effectiveness is estimated to be \$8.04/lb or \$16,085/ton of PM₁₀.

Implementation Issues/Comments

The analysis assumes that inspectors would be issuing NOVs as part of their daily rounds and that no additional effort would be required to enforce this measure.

10. CONDUCT JUST-IN-TIME GRADING

Disturbed soil is vulnerable to erosion by both wind and water. Sediment controls to limit water pollution impacts from disturbed soil are well established. Stabilization requirements to minimize wind erosion have been implemented by communities that exceed ambient PM₁₀ standards under high wind conditions. Examples of those communities include Clark County, Nevada, Coachella Valley, California, Maricopa County, and Bullhead City Arizona. Bullhead City is the only community that has implemented a just-in-time grading control measure.* A description of the ordinance implementing this measure is contained in the community's Maintenance Plan.† It requires "control of dust during grading and excavation," it also requires "that the property be left in a condition that prevents dust from arising." A review of Maricopa County's Rule 310, however, shows that it requires all disturbed surface areas to be stabilized under the following conditions:

- Pre-activity work practices;
- Work practices during operations;
- Temporary stabilization (up to 8 months) required during weekends, after work hours and on holidays; and
- Permanent stabilization required within 8 months of ceasing dust-generating operations.

Since these requirements do not specify any time period when stabilization requirements are in force, it does not appear that a just-in-time grading requirement will provide any additional emission reductions that would not come from the enforcement of Rule 310.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

No estimate of the cost of implementing and complying with this measure is available.

* Discussions with Clark County staff confirmed that they do not have a "just-in-time-grading" control measure. Instead, they recommend that projects be staged so no more than 100 acres are disturbed at a time and the rest of the project is treated with dust suppressants.

† <http://www.azdeq.gov/environ/air/plan/download/bcpm10.pdf>

Emission Reduction

This measure does not appear to offer an emissions benefit.

Cost Effectiveness

No estimate of the cost effectiveness is available.

Implementation Issues/Comments

Discussions with the County confirmed that there is no apparent benefit for this measure.

11. ESTABLISH CONTINUOUS MONITORING REQUIREMENTS FOR PERMITTED SOURCES LARGER THAN 50 ACRES

The continuous monitoring of fenceline PM₁₀ concentrations has been imposed on larger surface mining operations in several Western states over the past decade. The intent of this enforcement measure is to provide assurance that ambient air quality standards are not being violated in sensitive areas near these types of projects. Because of the persistence of PM₁₀ violations in the Salt River area, the Maricopa County Air Quality Department has asked that a similar approach be evaluated for use at larger construction and mineral production facilities in this area. Under this concept, a facility would be required to operate two or more continuous PM₁₀ monitoring instruments and take corrective dust control action whenever the monitors reported exceedances of a specified dust concentration threshold. For the purpose of this analysis, we assumed that the corrective dust control action would consist of increased watering of haul roads and other actively disturbed soil surfaces.

To implement this measure local regulations or permits for earth moving and mineral productions facilities would need to be modified to include continuous monitoring requirements.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The costs of monitoring and watering were derived from cost data reported from earlier studies and local sources. For the cost of monitoring, we assumed that a regulated facility of more than 50 acres would be required to install four optical particle counters along fencelines in each of the cardinal directions from the center of dust-generating activities. As has been required of some energy facility construction sites adjacent to residential areas in California, we assumed that the monitors would run unattended on battery power during business hours and that acquired data would be downloaded and evaluated at the end of each day by a technical consultant. If the data demonstrated an exceedance of an adopted dust threshold, additional watering of nearby dust sources, under direction of the technical consultant, would be performed the next day and each subsequent day as necessary to maintain compliance at the monitor. We assumed that one additional water truck per facility would be pressed into service, and that this truck would be rented from an equipment supply service. The contract cost of the monitoring

and dust control consultant was estimated to be \$54,700 per year, and the additional watering cost was estimated to be \$111,500 using a leased water truck.

Emission Reduction

Emission reductions were calculated as the difference between baseline and controlled emission scenarios for onsite haul roads. The baseline scenario assumed 45% control of dust emissions (49% rule effectiveness x 90% control efficiency) from onsite construction activities, based on the rule effectiveness study completed by MCAQD in 2007. Uncontrolled construction emissions were estimated to be 46.0 tons of PM₁₀, based on the emission factors published in the WRAP fugitive dust handbook, and baseline emissions incorporating existing controls were estimated to be 20.1 tons for a 50-acre construction project.

The use of an additional water truck was estimated to increase emission control effectiveness to 72.3%, based on data reported by a Midwest Research Institute study of construction dust emissions for the South Coast AQMD in 2001. The increase in control efficiency produced an emission reduction of 7.7 tons of PM₁₀ during the duration of a 6-month, 50-acre residential construction project. This is equivalent to a daily emission reduction of 116 lbs per day of PM₁₀ during each construction day.

Cost Effectiveness

The overall cost effectiveness for this measure is estimated to be \$10.76 per lb or \$21,530 per ton of PM₁₀ reduced. Sierra performed a similar analysis of this measure for San Joaquin Valley.* The results of that analysis showed a cost effectiveness ranging between \$231,000 and \$339,000 per ton of PM₁₀ reduced. While the cost assumptions used in that study and this study are quite similar, the assumptions about emission benefits are significantly different. The San Joaquin Valley study assumed that monitoring would only indicate a need for watering on 5% of construction days. As a result, the high cost of continuous monitoring produced a small emissions benefit and a high \$/ton cost effectiveness estimate. In this analysis it was assumed that watering would occur every day of construction to avoid the cost of an NOV. Thus, essentially the same cost of monitoring would produce a large emissions benefit and a cost effectiveness that is an order of magnitude lower than reported in the San Joaquin Valley study. The actual cost effectiveness would depend on the behavior of the contractor operating the construction site.

* Final BACM Technological and Economic Feasibility Analysis, prepared for the San Joaquin Valley Unified Air Pollution Control District, March 21, 2003.

Implementation Issues/Comments

This analysis assumed the use of contract monitoring and dust control services. The cost effectiveness of this measure will be less if monitoring equipment and additional water trucks are owned by the construction contractor.

12. CONDUCT MOBILE MONITORING TO MEASURE PM₁₀ AND ISSUE NOV_s

The Maricopa County Board of Supervisors recently approved funding for a state-of-the-art mobile air-monitoring program. The County is currently taking bids on the instruments that will be used to equip a vehicle to measure pollutants on a mobile basis. The vehicle will be able to perform measurements on a variety of regulated pollutants, including ozone, carbon monoxide (CO), PM_{2.5}, PM₁₀, NO_x and a range of hazardous air pollutants (HAPs). The bids are still open on a number of pieces of equipment; therefore the County does not expect it to become operational for another 18-24 months (i.e., circa 2009). When the vehicle does become operational, it will not be dedicated to PM measurements as it will be used to investigate a broad range of complaints.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The cost of a mobile monitoring van is assumed to be equal to the funds approved by the Board of Supervisors (i.e., \$500,000). Assuming a useful life of 8 years, the annualized cost of the van will be \$93,722 per year. Assuming that the vehicle is dedicated to fugitive dust enforcement, which it is not, the van could be used to monitor 6 properties per day and support the issuance of 2 NOV_s per day. Based on these assumptions and the labor required to operate the van and supervise its operation the average cost per property per day is estimated to be \$102. This value increases to \$107 per property per day when the annualized daily cost of gravel pad is included.

Emission Reduction

Emission benefits were computed based on the assumption that facilities receiving NOV_s undertake either trackout control or sweeping. Trackout control was assumed to come from the construction and maintenance of a 50' gravel pad. Based on an EPA analysis* the control efficiency of a 50' gravel bed is 46%. When this value was combined with soil deposition rates, initial silt loadings, size of the trackout area and average Salt River

* Particulate Emission Measurements from Controlled Construction Activities, EPA/600R-01/031, U.S. EPA, April 2001.

traffic volumes, this measure was estimated to reduce 3.9 lbs of PM₁₀ per property per day.

Cost Effectiveness

The cost effectiveness of this measure is estimated to be \$54,233 per ton of PM₁₀ reduced.

Implementation Issues/Comments

The cost and cost effectiveness of this measure could be substantially improved by creating a vehicle that is dedicated to fugitive dust control. Such a vehicle would require much less instrumentation to monitor PM_{2.5}/PM₁₀ concentrations as opposed to NO_x, HAPs, etc. With a lower initial cost and the same level of PM₁₀ reductions the cost effectiveness of the measure would be improved.

13. CEASE DUST GENERATION ACTIVITIES DURING STAGNANT CONDITIONS

An analysis of meteorological data collected for days when the ambient PM₁₀ standard has been exceeded in recent years in the Salt River shows:

- Wind speeds are less than 1 meter/second;
- Dispersion is limited because of low mixing heights (i.e., inversions);
- There is limited transport of emissions from outside of the area; and
- Stagnant conditions persist for multi-day periods.

An analysis of the monitoring data shows that maximum concentrations are typically recorded in the early morning hours. This is because the combination of low wind speeds and mixing heights allow concentrations to build over time. High levels of activity in the early morning hours add emissions on top of elevated concentrations from the previous day and lead to exceedances. Concentrations typically drop after about 8 am once there has been enough solar heating to lift the mixing height and increase dispersion.

The goal of this measure is to reduce early morning emissions from facilities located within high emission density areas on days when exceedances are expected to occur. A review of meteorological data collected by ADEQ between November 1st and February 15th for the past 3 years in the Salt River shows that on average the following days were called during that season:

- 8.25 high pollution advisory (HPA) days;
- 8.80 stagnation days occurred; and
- 9.90 exceedances occurred.

This information suggests that participating facilities would need to be able to cease early morning operations on roughly 10 days per season (if High Pollution Watch days are included the number of days would increase to 13). Effort will be required to determine which industries have the flexibility to cease operations during this time period. A variety of implementation issues would need to be investigated and defined to implement this measure, including minimum lead time notification requirements, emission density limits that would define the area of participation, compliance options, the need for tax credits to offset lost production, etc.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

No estimates of the cost of developing, implementing or complying with this measure are currently available.

Emission Reduction

The emission reductions from this measure would be limited. The number of days in which activities cease would be limited, the number of participating facilities would also be limited as would the geographic coverage. As a result, the emission reductions that would accrue to the Five Percent Plan would be quite limited. However, the successful implementation of this measure would significantly enhance the probability of attainment at monitors located in areas with a history of exceedances.

Cost Effectiveness

Insufficient information is available to estimate the cost effectiveness of this measure.

Implementation Issues/Comments

Another option for implementing this measure is to shift the lost hours of operation to another time period. The cost and benefits of this approach are investigated in Measure #21.

14. ESTABLISH MAINTENANCE REQUIREMENTS FOR PAVED ROADS AND PARKING LOTS

During the field study of Salt River fugitive PM₁₀ sources conducted in November and December of 2006, visible emissions were observed from vehicle travel over paved parking lots lightly covered with deposited soil. As a result of this observation, a request was made to evaluate the cost effectiveness of maintaining such paved parking lots and roadways by periodic sweeping with PM₁₀-efficient sweepers.

Under this measure, all paved parking lots and roads would be swept at least every two weeks.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The periodic cost of sweeping was estimated from contract data received from the Maricopa County Department of Transportation. A 1-acre paved parking lot was selected for analysis as a typical example. The cost of bi-weekly sweeping of a 1-acre parking lot by a contract service was estimated to be \$871 per year.

Emission Reduction

The emission reductions achieved by periodic sweeping were calculated as the difference in paved road travel emissions for surfaces with two different silt loadings. The activity level for unpaved parking published in the 2005 Maricopa County emission inventory of 100 vehicles per day per acre was used as a default activity level for this analysis. The average travel distance per parking cycle on a 1-acre lot was estimated to be the distance from one corner of a square lot to the center of the lot and back along travel links parallel to the sides of the lot (200 feet). The silt level of an unmaintained parking lot (0.60 g/m²) was assumed to be twice that of the average Salt River street silt level measured and reported in the Salt River technical support document prepared by ADEQ in 2005. Sweeping by a PM₁₀-efficient sweeper was assumed to remove 86%, as measured in tests conducted by the University of California Riverside on sweepers seeking PM₁₀-efficient certification. We also assumed that a completely cleaned parking lot (i.e., with 100% removal of surface silt) returned to pre-swept silt conditions in 10 days of use, from an engineering estimate published in a South Coast Air Quality Management District cost-

effectiveness analysis. On the basis of these assumptions, the emission reduction produced by sweeping a 1-acre parking lot every two weeks was calculated to be 5.4 pounds of PM₁₀ per year.

Cost Effectiveness

The overall cost effectiveness is estimated to be \$160.22 per pound, or \$320,444 per ton, of PM₁₀ reduced.

Implementation Issues/Comments

This analysis assumes a relatively low silt loading and low traffic levels of light-duty vehicles operating on parking lots targeted for sweeping. Both of these values are based on engineering estimates. The use of higher values and heavier vehicles, if justified, would improve the calculated cost effectiveness of this measure.

15. CONDUCT NIGHTTIME INSPECTIONS

Currently, inspectors employed by the Maricopa County Air Quality Department (MCAQD) conduct inspections of permitted facilities – construction sites and mineral processing facilities – during normal work hours. Through interviews of mineral facility production staff, we learned that substantial mineral processing and construction activity occurs before daylight during the summer months to take advantage of cooler temperatures, especially for concrete pouring. Nighttime operations also occur to a lesser extent during winter months.

Under this measure, dust control inspections would be conducted during nighttime hours to assure compliance with Rule 310 during these periods. Because the 20% opacity limit in Rule 310 is very difficult to verify and enforce during nighttime hours, we assumed that inspections during these hours would involve use of portable dust monitors and the establishment of new fence-line PM₁₀ concentration limits. We assumed that MCAQD would purchase DustTrak optical particle counters and pay inspectors a nighttime pay differential for working these hours. We also assumed that facility operators would increase the use of watering for additional dust control during nighttime hours if inspections found conditions of noncompliance.

The emission scenario we used in this analysis was a 50-acre residential construction site and that increased watering would involve the use of two additional water trucks during nighttime hours.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The costs of this measure include enforcement and dust control elements. We assumed that verification of compliance at night would be determined through spot monitoring with a portable optical particle counter. Amortized over an 8-year life, the monitor would cost \$3.94 per 50-acre project, assuming that 200 projects were checked each year. Assuming that each project is inspected four times for two hours each by a MCAQD inspector paid a night differential rate, the additional night inspection costs were calculated to be \$198.68 per project. We also estimated that processing one notice of violation per project would cost an additional \$276.99 per project, for a total of inspection and enforcement costs of \$479.31 per project. The use of two additional water trucks during night work hours was estimated to cost \$54,433 per project. (A 50-acre residential project is assumed to require 6 months to construct, from data contained in the

WRAP Fugitive Dust Handbook.) The total cost of this measure was calculated to be \$54,912 per project.

Emission Reduction

For baseline emissions, we assumed that disturbed areas were being watered every four hours, resulting in a control efficiency of 50%, which is close to the current effectiveness of Rule 310 as reported by MCAQD in 2007. The response to this measure was assumed to be the operation of two additional water trucks during nighttime hours. Disturbed areas would be watered every 1.7 hours, resulting in a control efficiency of 79%. By applying these control efficiencies to the uncontrolled nighttime emissions of 17.9 tons per PM₁₀, we computed the emission reduction to be 3.8 tons of PM₁₀ per 50-acre project.

Cost Effectiveness

The cost effectiveness of this measure was calculated to be \$5.38 per pound, or \$10,752 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis assumes that additional dust control at an affected project will be gained through additional watering of actively disturbed areas. If other control techniques are used to reduce PM₁₀ emissions, both the magnitudes of emission reduction and cost could change dramatically from the scenario considered in this analysis.

In response to comments, the analysis of this measure was modified to account for the benefit that would result from a higher baseline compliance rate (due to a lagged response to recent increases in settlement fines). To account for this response, the baseline control efficiency was increased from 50% to 70%. One additional watering truck would be required to increase control efficiency from a baseline of 70% to the target of 80%. The cost effectiveness computed for this increment is estimated to be \$10.82 per lb or \$21,631 per ton of PM₁₀ reduced.

16. INCREASE INSPECTION FREQUENCY FOR PERMITTED FACILITIES

Maricopa County Air Quality Department (MCAQD) currently conducts formal compliance inspections of the 26 major mineral processing facilities in the Salt River area a total of four times each year.* These inspections are comprehensive in that both physical inspections of operating equipment and document reviews of required records are conducted. Additional inspections of specific equipment, activities, or portions of facilities are conducted on an as-needed basis in responding to complaints.

Under this measure, formal compliance inspections of major facilities would be conducted more frequently. For the purposes of analysis, we assumed that two additional inspectors would be hired by MCAQD and assigned solely to inspections of permitted facilities. Although inspections of permitted facilities would include both stationary sources and construction sites, our analysis looked exclusively at stationary sources. We also assumed that inspections of mineral processing facilities would focus more on evaluations of compliance with operating and emission limitations, and less on recordkeeping requirements, to the extent that each inspector would inspect two permitted facilities per day. We assumed that the predominant violations would be of visible dust limitations on fugitive sources, and that the control option implemented by affected operators would be increases in watering frequencies on haul roads, unpaved traffic areas, and open material transfer operations.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The costs of implementing this measure would include additional inspection and enforcement costs borne by MCAQD, and additional dust control costs borne by facilities found to be out of compliance. The salaries of inspection and enforcement staff were obtained from MCAQD, and the costs of additional watering at affected facilities were based on truck rental prices obtained from a local equipment-leasing firm. Labor rates for water truck operation were obtained from the U.S. Bureau of Labor Statistics for the Maricopa area. The costs of increased inspection and enforcement were estimated to be \$5,900 per facility per year, and additional watering costs were estimated to be \$139,300, for a total of \$145,200 per year per facility.

* The Salt River SIP committed to one planned and three surprise inspections of these facilities each year.

Emission Reductions

We computed emission reductions as the difference in emissions for onsite material transport over unpaved haul roads when roads were watered every four hours versus every two hours. From the 2002 emission inventory published in the Salt River PM₁₀ Technical Support Document compiled by ADEQ, we reviewed the annual mineral production rates of the larger facilities operating in the Salt River area and selected 500,000 tons per year as a benchmark for analysis. We computed an uncontrolled haul road emission factor for an on-highway haul truck, and applied a calculated control efficiency resulting from road watering every four hours in 2002 to derive a 2002 emission factor for onsite hauling of 1.13 lb/VMT. By dividing total annual haul road emissions reported in the TSD by this emission factor, we estimated that total haul road VMT was 177,940 miles in 2002 for Salt River facilities. By dividing this VMT by the total production rate reported by these facilities of 5,684,987 tons, we computed the onsite average haul distance of mineral product to be 0.031 VMT per ton. We computed onsite haul road emissions for the benchmark facility by multiplying this value by 500,000 tons per year to derive an annual emission estimate of 17,670 pounds of PM₁₀ in 2002. Because control regulations have become more restrictive since 2002, for a 2006 emission baseline we assumed that haul roads are being watered every two hours. By estimating a control efficiency for haul road watering every two hours, we computed annual baseline haul road emissions to be 8,835 pounds of PM₁₀.

Under this measure, we assumed that haul road watering frequency would be increased to once per hour. Using the same methodologies, we estimated a control efficiency for this level of watering and applied it to the uncontrolled emission rate to compute controlled annual emissions to be 4,417 pounds of PM₁₀ per year. The resulting emission reduction in for this benchmark facility is 4,417 pounds of PM₁₀ per year.

Cost Effectiveness

The overall cost effectiveness is estimated to be \$32.88 per pound, or \$65,765 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis assumes that additional dust control at an affected facility will be gained through additional watering of haul roads and other actively disturbed areas. If other control techniques are used to reduce PM₁₀ emissions, both the magnitudes of emission reduction and cost could change dramatically from the scenario considered in this analysis.

17. INCREASE NUMBER OF PROACTIVE INSPECTIONS IN AREAS OF HIGHEST PM₁₀ EMISSIONS DENSITIES

The Arizona Department of Environmental Quality (ADEQ) developed an emission inventory of Salt River sources for use in modeling impacts as part of the Salt River study in 2004-2005. The allocation of emissions to modeling grid cells indicated that the cells having highest PM₁₀ emissions densities were those containing the mineral processing operations of the larger production facilities. An increase in the number of proactive inspections of these facilities will result in costs and emission reductions very similar to those analyzed in Measure #16 (Increase Inspection Frequency for Permitted Facilities). One additional cost component under this measure would be the expense of training facility operations foremen in dust control practices through a course developed by the Maricopa County Air Quality Department (MCAQD).

For the purposes of analysis, we assumed that two additional inspectors would be hired by MCAQD and assigned solely to inspections of mineral production facilities in the Salt River area. We also assumed that inspections of mineral processing facilities would focus more on evaluations of compliance with operating and emission limitations, and less on recordkeeping requirements, to the extent that each inspector would inspect two permitted facilities per day. We assumed that the predominant violations would be of visible dust limitations on fugitive sources, and that the control option implemented by affected operators would be increases in watering frequencies on haul roads, unpaved traffic areas, and open material transfer operations.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The costs of implementing this measure would include additional inspection and enforcement costs borne by MCAQD, training costs borne by permitted facilities, and additional dust control costs borne by facilities found to be out of compliance. The salaries of inspection and enforcement staff were obtained from MCAQD, and the costs of additional watering at affected facilities were based on truck rental prices obtained from a local equipment-leasing firm. Labor rates for operations foremen attending dust control classes and operators driving water trucks were obtained from the U.S. Bureau of Labor Statistics for the Maricopa area. The costs of increased inspection and enforcement were estimated to be \$5,900 per facility per year, training costs were estimated to be \$300 per year (assuming training is repeated every three years), and

additional watering costs were estimated to be \$139,353, for a total of \$145,553 per year per facility.

Emission Reductions

We computed emission reductions as the difference in emissions for onsite material transport over unpaved haul roads when roads were watered every four hours versus every two hours. From the 2002 emission inventory published in the Salt River PM₁₀ Technical Support Document compiled by ADEQ, we reviewed the annual mineral production rates of the larger facilities operating in the Salt River area and selected 500,000 tons per year as a benchmark for analysis. We computed an uncontrolled haul road emission factor for an on-highway haul truck, and applied a calculated control efficiency resulting from road watering every four hours in 2002 to derive a 2002 emission factor for onsite hauling of 1.13 lb/VMT. By dividing the total annual haul road emissions reported in the TSD by this emission factor, we estimated that total haul road VMT was 177,940 miles in 2002 for Salt River facilities. By dividing this VMT by the total production rate reported by these facilities of 5,684,987 tons, we computed the onsite average haul distance of mineral product to be 0.031 VMT per ton. We computed onsite haul road emissions for the benchmark facility by multiplying this value by 500,000 tons per year to derive an annual emission estimate of 17,670 pounds of PM₁₀ in 2002. Because control regulations have become more restrictive since 2002, for a 2006 emission baseline we assumed that haul roads are being watered every two hours. By estimating a control efficiency for haul road watering every two hours, we computed annual baseline haul road emissions to be 8,835 pounds of PM₁₀.

Under this measure, we assumed that haul road watering frequency would be increased to once per hour. Using the same methodologies, we estimated a control efficiency for this level of watering and applied it to the uncontrolled emission rate to compute controlled annual emissions to be 4,417 pounds of PM₁₀ per year. The resulting emission reduction for this benchmark facility is 4,417 pounds of PM₁₀ per year.

Cost Effectiveness

The overall cost effectiveness is estimated to be \$32.95 per pound, or \$65,899 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis assumes that additional dust control at an affected facility will be gained through additional watering of haul roads and other actively disturbed areas. If other control techniques are used to reduce PM₁₀ emissions, both the magnitudes of emission reduction and cost could change dramatically from the scenario considered in this analysis.

18. NOTIFY VIOLATORS MORE RAPIDLY TO PROMOTE IMMEDIATE COMPLIANCE

This measure would require inspectors that observe visible dust violations to inform on-site personnel so that corrective measures can be taken to eliminate activities causing the violation. Inspectors typically contact on-site staff at the time a NOV is issued about the need for corrective actions. Discussions with the County indicate that while this is the norm for industrial operations, it is frequently difficult to make contact with vacant lot property owners when visible land disturbance is discovered. Typically, no one is on the property at the time the disturbance is noted. Rule 310 provides 60 days for owners to stabilize disturbances on vacant lots, unpaved lots, etc. once they receive a letter notifying them of the violation. A NOV is only issued after the landowner fails to respond to the initial letter (i.e., 60 days after issuance of the letter). Discussions with the County indicate that frequently it takes time to identify the owner and resolve the problem. The response time is governed by the financial resources of the owner and their understanding of the options available to them to correct the violation.

The goal of this measure is to reduce the time available for compliance once violations have been identified. Any activity producing elevated emissions during winter months must be eliminated as soon as possible.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

No estimate of the cost of the enforcement expense of implementing this measure is available. The cost of compliance depends on the form of stabilization chosen by the owner to eliminate the disturbance.

Emission Reduction

Unpaved parking lots are estimated to produce 3,009 tons per year in the 2005 PM₁₀ nonattainment area. Windblown dust is estimated to produce 1,087 tons of PM₁₀ in the 2005 inventory. No estimate of emissions from delayed compliance in these source categories is available.

Cost Effectiveness

The cost effectiveness of this measure depends on the form of stabilization selected to correct the violation. The minimum value is estimated to be \$6,100 per ton of PM₁₀ reduced (by using palliatives to stabilize unpaved parking lots, see Measure #32 – Pave or Stabilize Existing Unpaved Parking Lots) and the maximum value is estimated to be \$239,050 per ton of PM₁₀ reduced (by placing a rock barrier to eliminate trespass activity, see Measure #38 – Strengthen and Increase Enforcement of Rule 310.01 for Vacant Lots).

Implementation Issues/Concerns

While the benefits of this measure may contribute little to the Five Percent Plan, they will aid attainment at monitoring sites experiencing high wind exceedances. Education about control option alternatives may be the key to the successful implementation of this measure.

19. FULLY IMPLEMENT RULE 316

Maricopa County adopted Rule 316 in 1993 to control emissions from commercial, nonmetallic mineral processing plants and rock product plants. PM₁₀ emissions from these facilities are generated during the mining, processing and handling (i.e., transporting, loading/unloading, conveying, crushing, screening, mixing and storing) of nonmetallic minerals. Unpaved roads and trackout are examples of area sources of PM₁₀ emissions from facility operations. Historically, Rule 316 has contained only emission limitations that apply to industrial processes and not fugitive dust control measures specific to area sources located at nonmetallic mineral processing facilities. Facilities with area sources subject to Rule 316 have been required to comply with fugitive dust control measures in Rule 310.

Rule 316 was revised in 1999 to make the existing standards consistent with revisions to the Standards of Performance for Nonmetallic Mineral Processing Plants (40 CFR, Part 60, Subpart OOO). Revisions to Rule 316 were also adopted in 2005 to incorporate best available control measures (BACM) and most stringent measures (MSM) that were included in the Salt River State Implementation Plan (SIP). Revisions addressing industrial operations included process controls (i.e., enclosures, watering systems, operational overflow warning systems/devices and fabric filter baghouses) and process emission limitations (i.e., stack emission limitations). Revisions added to control emissions from fugitive dust sources, included:

- Applying dust suppressants;
- Installing and maintaining rumble grates, wheel washers, vehicle washers and truck washers;
- Installing and maintaining gravel pads from rumble grates and washers to facility exits;
- Paving from rumble grates to wheel washers and vehicle washers;
- Stabilizing haul/access roads and facility entries and exits;
- Stabilizing open storage piles and material handling;
- Ceasing active operations during a high wind event; and
- Cleaning paved internal roads.

The addition of the fugitive dust controls eliminated the need for sources subject to Rule 316 to comply with Rule 310 area source requirements. Revisions to Rule 316 underwent a formal rulemaking process which quantified the costs, benefits and cost

effectiveness of the proposed changes. Comments on those estimates were received and responded to in the final rulemaking.*

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The Rulemaking presented estimates of the annualized cost required to implement the rule for three facility sizes:

- Large-Sized Facility – \$101,314 - \$116,067
- Medium-Sized Facility #1 – \$92,755 - \$107,508
- Medium-Sized Facility #2 – \$86,717 - \$101,469
- Small-Sized Facility – \$22,653 - \$44,976

Emission Reduction

The Rulemaking presented the following annual PM₁₀ emission reduction estimates:

- Large-Sized Facility – 17.11 tons
- Medium-Sized Facility #1 – 11.7 tons
- Medium-Sized Facility #2 – 7.71 tons
- Small-Sized Facility – 0.61 tons

Cost Effectiveness

The Rulemaking presented the following estimates of cost effectiveness (i.e., \$/ton of PM₁₀ reduced):

- Large-Sized Facility – \$4,802 - \$5,501
- Medium-Sized Facility #1 – \$6,417 - \$7,347
- Medium-Sized Facility #2 – \$9,126 - \$10,678
- Small-Sized Facility – \$30,087 - \$59,750

Implementation Issues/Comments

Based on the emission reduction estimates presented in the Rulemaking, fully implementing Rule 316 will not significantly impact the required 5% per year emission

* Arizona Administrative Register, County Notices Pursuant to A.R.S § 49-112, Notice of Final Rulemaking, Maricopa County Air Pollution Control Regulations, Regulation III, Rule 316 – Nonmetallic Mineral Processing.

reduction requirements. These reductions, however, will significantly aid attainment at the monitors and a modeling demonstration of attainment.

20. REQUIRE PRIVATE COMPANIES TO USE PM₁₀ CERTIFIED STREET SWEEPERS ON PAVED AREAS INCLUDING PARKING LOTS

During the field study of Salt River fugitive PM₁₀ sources conducted in November and December of 2006, visible emissions were observed from vehicle travel over paved parking lots lightly covered with deposited soil. As a result of this observation, a request was made to evaluate the cost effectiveness of maintaining such paved parking lots and roadways by periodic sweeping with PM₁₀-efficient sweepers. This measure is identical to the control scenario analyzed in Measure #14 (Establish Maintenance Requirements for Paved Roads and Parking Lots).

Under this measure, all paved parking lots and roads would be swept at least every two weeks.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The periodic cost of sweeping was estimated from contract data received from the Maricopa County Department of Transportation. A 1-acre paved parking lot was selected for analysis as a typical example. The cost of bi-weekly sweeping of a 1-acre parking lot by a contract service was estimated to be \$871 per year.

Emission Reduction

The emission reductions achieved by periodic sweeping were calculated as the difference in paved road travel emissions for surfaces with two different silt loadings. The activity level for unpaved parking published in the 2005 Maricopa County emission inventory of 100 vehicles per day per acre was used as a default activity level for this analysis. The average travel distance per parking cycle on a 1-acre lot was estimated to be the distance from one corner of a square lot to the center of the lot and back along travel links parallel to the sides of the lot (200 feet). The silt level of an unmaintained parking lot (0.60 g/m²) was assumed to be twice that of the average Salt River street silt level measured and reported in the Salt River technical support document prepared by ADEQ in 2005. Sweeping by a PM₁₀-efficient sweeper was assumed to remove 86%, as measured in tests conducted by the University of California Riverside on sweepers seeking PM₁₀-efficient

certification. We also assumed that a completely cleaned parking lot (i.e., with 100% removal of surface silt) returned to pre-swept silt conditions in 10 days of use, from an engineering estimate published in a South Coast Air Quality Management District cost effectiveness analysis. On the basis of these assumptions, the emission reduction produced by sweeping a 1-acre parking lot every two weeks was calculated to be 5.4 pounds of PM₁₀ per year.

Cost Effectiveness

The overall cost effectiveness is estimated to be \$160.22 per pound, or \$320,444 per ton, of PM₁₀ reduced.

Implementation Issues/Comments

This analysis assumes a relatively low silt loading and low traffic levels on parking lots targeted for sweeping. Both of these values are based on engineering estimates. The use of higher values, if justified, would improve the calculated cost effectiveness of this measure.

21. SHIFT HOURS OF OPERATION DURING STAGNANT CONDITIONS IN NOVEMBER THROUGH FEBRUARY

This is a variant of Measure #13, Cease Dust Generating Operations During Stagnant Conditions. The difference is that instead of ceasing operations during the early morning hours that precede violations, participating facilities would start their daily operations after 9 am (the time at which inversions typically breakup) and extend their operations later in the day to offset the lost early morning hours. In contrast to Measure #13, this measure would produce no emission reductions, because operations would be shifted from one time period to another. Therefore, no benefits would accrue to the Five Percent Plan.

As noted in the discussion of Measure #13, participating facilities would need to be able to shift early morning operations on roughly 10 days per season (more if High Pollution Watch days are included). Effort will be required to determine which industries have the flexibility to shift operations during this time period. A variety of implementation issues would need to be investigated and defined to implement this measure, including minimum lead time notification requirements, emission density limits that would define the area of participation, compliance options, the need for tax credits to offset losses in efficiency, etc.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

No estimates of the cost of developing, implementing or complying with this measure are currently available.

Emission Reduction

This measure will produce no reduction in emissions. However, the successful implementation of this measure would significantly enhance the probability of attainment at monitors located in areas with a history of exceedances.

Cost Effectiveness

Insufficient information is available to estimate the cost effectiveness of this measure.

Implementation Issues/Comments

Once agreement is reached on how to implement this measure, effort will be needed to define a communication mechanism which provides adequate lead time for companies to inform their staff that tomorrow's operations will be shifted.

22. MODEL CUMULATIVE IMPACTS FOR NEW OR MODIFIED EXISTING SOURCES

Currently, monitoring data recorded at the Durango Complex and West 43rd Avenue stations show violations of federal PM₁₀ ambient air quality standards. When new facilities, or modifications of existing facilities, are proposed that would result in emissions increases exceeding 70 tons of PM₁₀ per year (referred to as major sources), such emissions increases are required to be offset and a net benefit in air quality must be demonstrated. For new or modified sources that would produce emissions increases of less than 70 tons of PM₁₀ per year (minor sources), no emissions offsets or demonstration of air quality benefit are required. Under this measure, all new or modified source applications would have to include air quality modeling of proposed emissions increases and emissions from existing nearby facilities to determine the cumulative air quality impacts in the area impacted by the new or modified source. If the modeling demonstrated that the federal PM₁₀ ambient air quality standards would be violated, then the application must include emission reduction offsets sufficient to show no violations of standards.

The effect of this measure would be to require cumulative air quality modeling and emission offsets of new or modified sources in areas where modeling revealed violations of federal standards. Since the costs of modeling would be amortized over the life of the project, it is difficult to estimate an annualized cost effectiveness ratio for this component. The cost effectiveness of emissions offsets, however, can be estimated because these would be identical to the cost effectiveness of control measures that facility owners could undertake in the absence of governmental regulatory action. For example, if the proponent of a new minor facility were required to secure emission offsets equal to the proposed emissions of the new facility, that person could pave or treat public or private unpaved roads or parking areas in the immediate area to generate these offsets. The cost effectiveness of generating these offsets would be the cost effectiveness of the unpaved road or parking lot control technology.

We identified unpaved road dust palliative treatment as the most cost-effective source control that was available to a new facility proponent.

Cost Effectiveness

The overall cost effectiveness of this measure is estimated to be \$0.07 per pound, and \$141 per ton, of PM₁₀ reduced resulting from the treatment of unpaved roads that carry more than 120 but less than 150 vehicles per day with lignosulfonate dust palliative.

Implementation Issues/Comments

This analysis assumes that unpaved roads of sufficient emissions are near any site proposed for construction and operation of a new minor source, such that modeling of source emission increases and unpaved road emission reductions can demonstrate no increase in PM₁₀ concentrations. If other fugitive dust sources must be controlled to provide the needed offsets, then the cost effectiveness of this measure will be correspondingly higher.

23. CONDUCT NIGHTTIME AND WEEKEND INSPECTIONS

This measure is essentially the same as Measure #15, Conduct Nighttime Inspections, except that inspections would also occur on weekends. Currently, inspectors employed by the Maricopa County Air Quality Department (MCAQD) conduct inspections of permitted facilities – construction sites and mineral processing facilities – during normal work hours. Through interviews of mineral facility production staff, we learned that substantial mineral processing and construction activity occurs before daylight during the summer months to take advantage of cooler temperatures, especially for concrete pouring. Nighttime operations also occur to a lesser extent during winter months.

Under this measure, dust control inspections would be conducted during nighttime and weekend hours to assure compliance with Rule 310 during these periods. Because the 20% opacity limit in Rule 310 is very difficult to verify and enforce during nighttime hours, we assumed that inspections during these hours would involve use of portable dust monitors and the establishment of new fenceline PM₁₀ concentration limits. We assumed that MCAQD would purchase DustTrak optical particle counters and pay inspectors a nighttime pay differential for working these hours. We also assumed that facility operators would increase the use of watering for additional dust control during nighttime hours if inspections found conditions of noncompliance.

The emission scenario we used in this analysis was a 50-acre residential construction site and that increased watering would involve the use of two additional water trucks during nighttime hours.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The costs of this measure include enforcement and dust control elements. We assumed that verification of compliance at night would be determined through spot monitoring with a portable optical particle counter. Amortized over an 8-year life, the monitor would cost \$3.94 per 50-acre project, assuming that 200 projects were checked each year. Assuming that each project is inspected four times for two hours each by a MCAQD inspector paid a night differential rate, the additional night inspection costs were calculated to be \$198.68 per project. We also estimated that processing 1 notice of violation per project would cost an additional \$276.99 per project, for a total of

inspection and enforcement costs of \$479.31 per project. The use of two additional water trucks during night work hours was estimated to cost \$54,433 per project. (A 50-acre residential project is assumed to require 6 months to construct, from data contained in the WRAP Fugitive Dust Handbook.) The total cost of this measure was calculated to be \$54,912 per project.

Emission Reduction

For baseline emissions, we assumed disturbed areas are watered every four hours, resulting in a control efficiency of 50%, which is close to the current effectiveness of Rule 310 as reported by MCAQD in 2007. By having two additional water trucks operate during nighttime hours, disturbed areas would be watered every 1.7 hours, resulting in a control efficiency of 79%. By applying these control efficiencies to the uncontrolled nighttime emissions of 17.9 tons per PM_{10} , we computed the emission reduction to be 3.8 tons of PM_{10} per 50-acre project.

Cost Effectiveness

The cost effectiveness of this measure was calculated to be \$5.38 per pound, or \$10,752 per ton, of PM_{10} reduced.

Implementation Issues/Concerns

This analysis assumes that additional dust control at an affected project will be gained through additional watering of actively disturbed areas. If other control techniques are used to reduce PM_{10} emissions, both the magnitudes of emission reduction and cost could change dramatically from the scenario considered in this analysis.

24. BAN OR DISCOURAGE USE OF LEAF BLOWERS ON HIGH POLLUTION ADVISORY DAYS

Leaf blowers are used for landscaping maintenance for both commercial and residential areas. They are used to blow away dirt, leaves, small rocks, etc., on landscaped areas and adjacent sidewalks, driveways, and roadways. While they improve the appearance of the landscape, they blow dust particles in the air and contribute to particulate pollution. They also produce exhaust emissions and generate high noise levels. Maricopa County estimates leaf blowers produced 843 tons of fugitive dust or 1% of the PM₁₀ emitted annually within the nonattainment area in 2005.

This measure would involve restricting or prohibiting the use of blowers for landscaping maintenance in Maricopa County on days when monitors are expected to record a violation of the ambient PM₁₀ standard.

Suggested Implementing Agency

Maricopa County and the MAG cities and towns could pass ordinances prohibiting or restricting the use of blowers on High Pollution Advisory Days within their jurisdictions.

Cost

The cost of implementing this measure depends on who is using a blower. Homeowners and full-time maintenance staff at large facilities (e.g., schools, large parks, etc.) can simply delay their use of blowers to another day at no cost. In contrast, contractors who must travel from job to job may incur a cost depending on how they choose to comply with this restriction. Their options to comply include cleaning the job site manually, returning on the next available non-Advisory Day, or returning only on the next regularly scheduled maintenance day. The only option that incurs a cost is the one requiring an unscheduled return to use the blower. This option was estimated to have a cost of \$23 per day per residence.

Emission Reduction

The benefits of this measure depend on whether the use of the blower on the advisory day is completely foregone until the next regularly scheduled maintenance day or whether it is made up on a subsequent non-advisory day. If the blowing activity is made up (i.e., the contractor comes back the next non-advisory day to complete the blowing portion of the job), there is no annual emissions benefit from this measure since it has been delayed

from one day to another. If the blowing activity on the advisory day is foregone until the next regularly scheduled maintenance day, an annual emission reduction benefit would accrue. The benefit of foregone blowing is estimated to be 2.1 lbs per day per residence.

There is one other option to comply with this measure, that is, choosing to use a broom rather than a blower to clean paved surfaces. Emission testing by U.C. Riverside,^{*} however, indicates that brooming on concrete produces fugitive dust emissions that are equivalent to those of leaf blowing.

Cost Effectiveness

The only scenario under which a cost-effectiveness estimate can be calculated is for the loss of emissions on an advisory day and under the assumption that the homeowner has to pay for the extra non-advisory visit. Under these conditions, the cost effectiveness of this measure is estimated to be \$10.93/lb or \$21,851/ton of PM₁₀.

Implementation Issues/Comments

Given the options for compliance and the dispersed nature of the activity, this measure would be very problematic to enforce and the benefits highly uncertain.

^{*} Determination (sic) Particulate Emission Rates from Leaf Blowers, University of California Riverside and San Joaquin Valley Air Pollution Control District, presented at the 15th International Emission Inventory Conference, New Orleans, May 2006.

25. ENCOURAGE USE OF LEAF VACUUMS TO REPLACE BLOWERS

Leaf blowers are used for landscaping maintenance for both commercial and residential areas. They are used to blow away dirt, leaves, small rocks, etc., on landscaped areas and adjacent sidewalks, driveways, and roadways. While they improve the appearance of the landscape, they blow dust particles into the air and contribute to particulate pollution. They also produce exhaust emissions and generate high noise levels. Maricopa County estimates leaf blowers produced 843 tons of fugitive dust or 1% of the PM₁₀ emitted annually within the nonattainment area in 2005.

This measure would involve encouraging the use of leaf vacuums to replace the use of blowers for landscaping maintenance in Maricopa County.

Suggested Implementing Agency

Maricopa County and the MAG cities, towns, school districts and community colleges could provide leadership on this measure and replace blowers with vacuums in their maintenance and clean-up operations. They could also pass an ordinance mandating the phase out and replacement of blowers over a suitable time period.

Cost

Based upon discussions with vendors, the analysis assumed that the purchase price of the typical 3 hp leaf vacuum to be \$275 and that a vacuum has an average life of three years. The operating expenses are estimated to be \$135 per year; this estimate, however, was not included in the analysis since it is roughly equivalent to the cost of operating existing blowers. No attempt was made to quantify the cost of enforcing this ordinance.

Emission Reduction

Previous analysis of this measure assumed collection efficiency of the vacuum bag was assumed to be 98%. This estimate was based on the collection efficiency of industrial fabric filters. Recent testing conducted by U.C. Riverside* found that particulate emissions from leaf vacuums are equal to those of leaf blowers even for particles as large

* Determination (sic) Particulate Emission Rates from Leaf Blowers, University of California Riverside and San Joaquin Valley Air Pollution Control District, presented at the 15th International Emission Inventory Conference, New Orleans, May 2006.

as 100 microns in diameter. It appears that leaf vacuum bags are not designed to collect dust.

Cost Effectiveness

The cost effectiveness of this measure is infinite since the emission reduction is zero.

Implementation Issues/Comments

The lack of an emissions benefit invalidates this measure.

26. REDUCE OFF-ROAD VEHICLE USE IN AREAS WITH HIGH OFF-ROAD VEHICLE ACTIVITY

The City of Goodyear recently implemented an ordinance* banning the use of off-highway vehicles (OHVs) and all terrain vehicles (ATVs) on unimproved property without the written permission of the property owner. The ordinance was implemented to address numerous complaints about problems caused by OHVs and ATVs operating in the Gila River bed and other desert areas within the City's boundaries. The complaints raised concern about the following impacts:

- Dust clouds significantly reduced drivers visibility on the roads;
- Unhealthy impacts of dust and odor on those with allergies and other medical problems;
- Ecological damage caused by oil, gasoline, tracks and debris; and
- Excessive noise.

The City was also concerned that it could be liable for fines of up to \$10,000 per day for failing to comply with Maricopa County Air Quality Regulations regulating fugitive dust.

The enforcement effort that accompanied the implementation of the ordinance included:

- The preparation and distribution of a brochure entitled "Let's make it clear, Information on the use of all-terrain vehicles (ATVs) and off-highway vehicles (OHVs) in the desert areas in the City of Goodyear."
- Purchase of an off-road vehicle for use by the Police Department to enter areas where OHVs and ATVs were being operated.
- Installation of signs notifying OHV's and ATV's operators of the new ordinance.
- Allocation of staff time to provide a visible enforcement presence in areas where OHVs and ATVs were being operated.

The ordinance makes it unlawful for any person to operate or drive any motor vehicle, motorcycle, minibike, dune buggy, ATV, motor scooter, or other form of transportation propelled by an internal combustion engine on private or public property without prior written permission of the owner of the property. A violation of this requirement is a

* Goodyear Ordinance 2006-981 Section 11-1-24.

misdemeanor offense with a fine of up to \$2,500 and/or imprisonment for a period of up to six months.

Discussions with the Chief of the Police indicate that OHV and ATV riders/operators terminated activity within the city boundaries once it became clear the ordinance was being enforced. The approach used to implement the ordinance was to distribute brochures, meet with riders/operators in the field and explain the new requirements and have a visible presence with a vehicle able to chase violators. No extra staff time was required to implement the ordinance and no arrests were made.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

The principal cost components of implementing this measure include the purchase price of the off-road vehicle by the Police Department (\$12,000) and the annual distribution of the brochure to residents (estimated to be \$7,500 per year). Since the City of Goodyear has 7,934 acres of open space, the annualized cost/per year of enforcing this measure is estimated to be \$1.31 per acre.

Emission Reduction

The 2005 PM₁₀ emission inventory estimates that off-road recreational vehicles produced 2,159 tons of PM₁₀ in the nonattainment area. Based on the ratio of open space acreage in the City of Goodyear to the total acreage of the nonattainment area, the City of Goodyear was responsible for 45.3 tons of off-road recreational PM₁₀ emissions. The ordinance appears to have eliminated all of those emissions from within the City's boundaries.

Cost Effectiveness

The cost effectiveness of this measure is estimated to be \$230 per ton of PM₁₀ reduced.

Implementation Issues/Comments

While the City of Goodyear has effectively eliminated off-road emissions within its borders, it is not clear that this activity has been eliminated from within the boundaries of the nonattainment area. The cost effectiveness of this measure and the magnitude of the emissions from the targeted activity make this an attractive measure for implementation. However, in order for reductions to be realized, the measure would need to be implemented throughout the nonattainment area so that off-road activity is effectively shifted outside of nonattainment area boundaries.

27. CREATE FUND TO PROVIDE INCENTIVES TO RETROFIT NONROAD DIESEL ENGINES AND ENCOURAGE EARLY REPLACEMENT WITH ADVANCED TECHNOLOGIES

Programs that provide financial incentives for reducing PM emissions from nonroad Diesel engines through voluntary retrofit of emission control systems or repowering of equipment with newer engines have been conducted in a number of areas. California's Moyer Program provides one example* and materials related to the design and implementation of such programs are available from the Western Regional Air Quality Partnership.† In general, these programs require a funding source that distributes funds for repower/retrofit projects that meet specific criteria. There are a wide range of nonroad Diesel engines used in a variety of applications that could be retrofitted or repowered, as well as potential criteria that could be used to determine which engines should be retrofit. Given this, a comprehensive assessment of this measure was not feasible.

In order to illustrate the potential emission benefits, costs, and cost effectiveness of such programs, a measure involving voluntary repowering or retrofitting of Tier 0 (pre-1998 model year) off-road Diesel construction equipment was evaluated. Repower was assumed to be by engines that meet the U.S. EPA's Tier 3 emission standards. Retrofit was assumed to be by either Diesel Oxidation Catalyst (DOC) or Diesel Particulate Filter (DPF). It was also assumed that the fund created would be sufficient to allow for either the repower or retrofit of 500 engines used in tractors, loaders, and backhoes and that the average unit affected is rated at 160 horsepower. Note that equipment retrofit will also necessitate the use of ultra-low sulfur Diesel fuel and will result in a fuel consumption penalty due to increased exhaust system backpressure.

The following table shows the estimated percentage reduction in PM_{2.5} emissions as well as emissions of other regulated pollutants. Reductions associated with repower were estimated using the NONROAD model, while estimates for the emission reductions associated with retrofit were developed from information published by U.S. EPA and CARB regarding verified devices. ‡

* See <http://www.arb.ca.gov/msprog/moyer/moyer.htm>.

† See <http://wrapair.org/forums/msf/index.html>.

‡ See <http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm>, <http://www.epa.gov/otaq/retrofit/retropotentialtech.htm> and <http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>.

Technology	PM_{2.5} Reduction	VOC Reduction	CO Reduction	NOx Reduction
Tier 3 Repower	55%	75%	75%	70%
Diesel Particulate Filters (DPFs)	85-90%	50-90%	50-90%	0
Diesel Oxidation Catalysts (DOC)	20-30%	50-90%	50-90%	0

Implementing Agency

This measure could be implemented by cities, towns, Maricopa County, and the Arizona Department of Transportation.

Costs

Repowering was estimated to cost \$16,000 with an additional \$6,000 for installation.* A summary of the cost for retrofits is shown in the following table. The cost for DPFs is estimated at \$4,000 per vehicle based on an average bus retrofit cost of \$7,500, which was scaled downward to account for the lower horsepower rating of the nonroad engines (300 hp for buses versus 160 horsepower for the nonroad equipment).† The cost for DOCs is estimated to be \$800 per vehicle based on an average bus retrofit cost of \$1,500 (again scaled downward).‡ In addition to the cost of the retrofit devices, there are costs associated with fuel economy penalties due to the retrofit devices. The estimated fuel economy penalties based on mid-range estimates published by the U.S. EPA§ for DPFs and DOCs are also shown in the following table.

Technology	Avg Retrofit Cost	Additional Costs
Diesel Particulate Filter (DPF)	\$4,000	~3% fuel economy penalty
Diesel Oxidation Catalyst (DOC)	\$800	~1% fuel economy penalty

Costs for repower were amortized over a ten-year life using a discount rate of 7%. Retrofit costs were amortized over a five-year life using a discount rate of 7% and Diesel fuel was assumed to cost \$2.50 per gallon.

* California Air Resources Board, "The Carl Moyer Memorial Air Quality Standards Attainment Program Guidelines," September 30, 2003.

† U.S. Environmental Protection Agency, "Technical Highlights, Questions and Answers on Using a Diesel Particulate Matter Filter in Heavy-Duty Trucks and Buses," Report No. EPA420-F-03-017, June 2003.

‡ U.S. Environmental Protection Agency, "Technical Highlights, Questions and Answers on Using a Diesel Oxidation Catalyst in Heavy-Duty Trucks and Buses," Report No. EPA420-F-03-016, June 2003.

§ See <http://www.epa.gov/otaq/retrofit/retropotentialtech.htm>.

Benefits

The emission reductions associated with the repower of 500 pieces of Tier 0 construction equipment with Tier 3 engines were estimated using the NONROAD model for calendar year 2010. Repower is estimated to reduce PM_{2.5} emissions by 0.03 tons per day. Similarly, the NONROAD model was used to estimate the emission benefits associated with retrofit. The average control efficiency of DPFs and DOCs was assumed to be 85% and 25%, respectively, and estimated PM_{2.5} reductions are 0.04 and 0.01 tons per day.

Cost Effectiveness

Based on the emission reductions and cost estimates discussed above, the average cost-effectiveness ratio for repower was estimated to be \$150,000 per ton of PM_{2.5} emissions eliminated. Assuming a cost of \$2.50 for nonroad Diesel fuel, an incremental cost of 5 cents per gallon for ultra-low sulfur Diesel fuel, and an average fuel usage rate of 4,000 gallons per year, in combination with the retrofit cost numbers shown above, the cost effectiveness was estimated to be \$44,000 and \$52,000 per ton of PM_{2.5} emissions eliminated for DPFs and DOCs, respectively.

Implementation Issues

Care must be taken to ensure that retrofit devices are used for verified/appropriate vehicle applications.

28. UPDATE THE STATUTES TO REQUIRE ULTRA-LOW SULFUR DIESEL FUELS FOR NONROAD EQUIPMENT

Control Measure Description

Arizona Revised Statutes section 41-2083J requires that all Diesel fuel sold in area A comply with a 500 ppm maximum sulfur content limit. Federal regulations contained in Subpart I of Part 80, Title 40 Code of federal regulations also impose limits on the sulfur content of Diesel fuel sold throughout the United States. At present, these regulations restrict the sulfur content of Diesel fuel sold in on-road vehicles to 15 ppm and will impose a similar limit on Diesel fuel sold for use in nonroad vehicles other than locomotives and marine vessels beginning in June 2010. Fuel used in locomotives and marine vessels must meet the 15 ppm sulfur limit beginning in June 2012. Under this measure, section 41-2083J would be revised to require that ultra-low sulfur Diesel fuel (i.e., 15 ppm) be used in nonroad equipment. For purposes of this evaluation, it was assumed that the revised statutes would be effective on January 1, 2008.

Implementing Agency

This measure would be implemented by the Arizona Department of Environmental Quality.

Costs

The U.S. EPA has estimated that compliance with the 15 ppm requirement for on-road engines will increase refining costs by 4 cents per gallon and that the total price increase associated with the 15 ppm sulfur restrictions for nonroad Diesel in the southwestern U.S. (PADD 5) will range from 5 to 7 cents per gallon.* However, as noted in the Implementation Issues section below, the actual costs may be higher depending on the availability of 15 ppm Diesel fuel during the 2007 to 2010 period.

Benefits

This control measure will reduce emissions of sulfur oxides from nonroad Diesel equipment. Assuming that the sulfur content of fuel complying with the current 500 ppm limit is actually about 450 ppm, the reduction in fuel sulfur content due to the measure will be approximately 435 ppm. Based on the U.S. EPA's NONROAD Model (version

* See Section 7 of the Regulatory Impact Analysis at <http://www.epa.gov/nonroad-diesel/2003nprm.htm>.

2005a, Feb. 2006), annual Diesel fuel consumption in Maricopa County by nonroad equipment and vehicles, except locomotives and marine vessels, will be as follows:

2008 - 171,994,675 gallons

2009 - 176,184,778 gallons

2010 - 180,374,871 gallons

Using these figures, an assumed density of 7 pounds per gallon for Diesel fuel, and assuming that 95% of sulfur is converted to SO₂ and 5% to sulfate, the emission reductions due to the control measure are approximately 1.4 tons per day of SO₂ and 0.1 ton per day of directly emitted sulfate. No direct PM emission reductions other than the reduction in sulfate are expected from the use of ultra-low sulfur Diesel fuel in nonroad equipment, although its use will facilitate retrofit of particulate control devices such as traps and Diesel oxidation catalysts.

Cost Effectiveness

Based on the emission reductions quantified above, and an assumed cost of 5 cents per gallon, the cost effectiveness of the proposed control measure is \$16,000 per ton of SO₂ and sulfate emissions eliminated.

Implementation Issues

The refining industry has indicated that there may be supply issues associated with the distribution of 15 ppm Diesel fuel as the federal requirements applicable to on- and nonroad vehicles become effective. To the extent that supply issues arise, costs could be much higher than estimated.

29. SWEEP STREETS WITH PM₁₀-CERTIFIED STREET SWEEPERS

Although most of the new street sweepers purchased in the Maricopa area in the past several years have been certified as PM₁₀-efficient, there are no local requirements that all new sweepers be certified. This measure proposes that all new sweepers be certified as PM₁₀-efficient. In the evaluation of cost effectiveness for this measure, we assumed that a jurisdiction was able to choose between a non-certified and a certified unit in replacing an existing street sweeper. We also assumed that a new street sweeper would be used to clean all four lanes of arterial streets, and that streets would be swept every two weeks.

Suggested Implementing Agency

This measure would be implemented by Maricopa County and the cities within the PM₁₀ nonattainment area.

Cost

The cost of this measure includes only the differential in purchase price between a certified PM₁₀-efficient sweeper and a non-certified unit. We assumed that there are no differences in operations and maintenance costs or life expectancy for the two types of units. Finally, we assumed that a new sweeper would clean 7.5 centerline-miles per day of 4-lane arterial roads, or a total of 75 centerline-miles of street every 10 working days (the total work days in a two week sweeping interval). The difference in purchase price was estimated to be \$649 per year as amortized over the 8-year useful life of a sweeper. This difference equated to \$8.66 per year per centerline-mile of street.

Emission Reduction

Emission reductions were computed as the difference in PM₁₀ emissions for a typical Salt River arterial street cleaned by each of the two types of sweepers. A PM₁₀-efficient sweeper was estimated to reduce street silt levels by 86%, and a non-certified unit was estimated to reduce silt levels by 55%, based on sweeper tests conducted for the South Coast AQMD sweeper certification program by the University of California Riverside. Streets were assumed to return to equilibrium silt conditions in 10 days after being completely cleaned based on a 1998 South Coast AQMD estimate. We used this information to estimate that silt loadings after a sweeping would rise by 10% of pre-swept levels per day until equilibrium levels were attained. Based on Salt River arterial

silt loadings, the emission reductions were calculated to be 11.9 pounds per day, or 2.16 tons per year, of PM₁₀ reduced.

Cost Effectiveness

The cost effectiveness of this measure was calculated to be \$0.002 per pound, or \$4.00 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis assumes that the maximum equilibrium return period of silt levels on a completely cleaned street is 10 days. Some evidence exists to suggest that the return period is much shorter, which would diminish the emission reductions calculated for use of a certified sweeper versus an uncertified unit.

30. RETROFIT ON-ROAD DIESEL ENGINES WITH PARTICULATE FILTERS

Control Measure Description

A number of programs have been implemented involving the voluntary or mandatory retrofit of on-road heavy-duty Diesel trucks (HDDTs) with PM control devices. The measure involves the retrofit of 1,000 pre-2007 model year heavy-duty Diesel trucks (HDDTs) with Diesel PM filters (DPFs) and Diesel oxidation catalysts (DOCs). The table below shows the range of potential emission benefits associated with DPFs and DOCs that have been verified by the U.S. EPA and CARB as being capable of reducing Diesel PM emissions.*

Technology	PM_{2.5} Reduction	VOC Reduction	CO Reduction
Diesel Particulate Filters	85-90%	50-90%	50-90%
Diesel Oxidation Catalysts	20-30%	50-90%	50-90%

Implementing Agency

This measure could be implemented by cities, towns, Maricopa County, and the Arizona Department of Transportation.

Costs

A summary of the cost for retrofits is shown in the following table. The cost for DPFs is estimated at \$11,875 per vehicle based on an average bus retrofit cost of \$7,500, which was scaled up to account for the higher horsepower rating of HDDT engines.[†] The cost for DOCs is estimated to be \$2,375 per vehicle from average bus retrofit cost of \$1,500 (again scaled up for HDDTs).[‡] In addition to the cost of the retrofit devices, there are costs associated with fuel economy penalties due to the retrofit devices. These penalties arise from increases in exhaust system backpressure caused by installation of the devices.

* See <http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm>, <http://www.epa.gov/otaq/retrofit/retropotentialtech.htm> and <http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>.

[†] U.S. Environmental Protection Agency, "Technical Highlights, Questions and Answers on Using a Diesel Particulate Matter Filter in Heavy-Duty Trucks and Buses," Report No. EPA420-F-03-017, June 2003.

[‡] U.S. Environmental Protection Agency, "Technical Highlights, Questions and Answers on Using a Diesel Oxidation Catalyst in Heavy-Duty Trucks and Buses," Report No. EPA420-F-03-016, June 2003.

The estimated fuel economy penalties based on mid-range estimates published by the U.S. EPA* for DPFs and DOCs are also shown in the following table.

Technology	Avg Retrofit Cost	Additional Costs
Diesel Particulate Filter (DPF)	\$11,875	~3% fuel economy penalty
Diesel Oxidation Catalyst (DOC)	\$2,375	~1% fuel economy penalty

Costs were amortized over a five-year useful life using a discount rate of 7%. Diesel fuel was assumed to cost \$2.50 per gallon, and average fuel economy and annual VMT of retrofit HDDTs were assumed to be 4.6 miles per gallon and 70,000 miles, respectively.

Benefits

The emission reductions associated with the retrofit of 1,000 pre-2007 model year HDDTs with either DPFs or DOCs were estimated. Average emission factors for pre-2007 HDDTs were developed from MOBILE6.2 using calendar year 2010. Annual average mileage was assumed to be 70,000 miles and it was assumed that retrofit vehicles were operated exclusively in the MAG region. The average control efficiency of DPFs and DOCs was assumed to be 85% and 25%, respectively, and estimated PM_{2.5} reductions were 0.083 and 0.024 tons per day.

Cost Effectiveness

Based on the emission reductions and cost estimates discussed above, the average cost-effectiveness ratios were estimated to be \$107,000 and 133,000 per ton of PM_{2.5} emissions eliminated for DOCs and DPFs, respectively.

Implementation Issues

Care must be taken to ensure that retrofit devices are used for verified/appropriate vehicle applications.

* See <http://www.epa.gov/otaq/retrofit/retropotentialtech.htm>.

31. REPAVE OR OVERLAY PAVED ROADS WITH RUBBERIZED ASPHALT

The City of Phoenix originally pioneered the use of rubberized asphalt to recycle waste tires in 1964 when it was incorporated into a “chip seal” program for city streets. Improvements in durability were offset by concerns about potential vehicle damage from loose chips and the program was discontinued in 1989. At about the same time, both the city and the state began incorporating rubber from recycled waste tires into a hot asphalt mix that was used to resurface roads. Subsequent research has shown that rubberized asphalt has many additional benefits, including reduced tire noise, increased skid resistance, improved surface drainage and more recently reduced tire wear.

Tire wear is a component of PM₁₀ emitted from motor vehicles. Other components include vehicle exhaust, brake wear and re-suspended road dust. According to EPA’s mobile source emission factor model, MOBILE6, PM₁₀ from tire wear is emitted at a rate of 0.010 g/mi (for the mix of vehicles operating in the nonattainment area). Based on information presented in the Salt River PM₁₀ Emissions Inventory, emission factors for the other components are all higher, including:

- Fugitive Dust – 0.30 g/mi
- Exhaust – 0.065 g/mi
- Brake Wear – 0.013 g/mi

Information on reductions in tire wear emissions was obtained from an Arizona State University study* that contrasted emissions from rubberized asphalt with portland cement concrete (PCC). The results of that study indicate that emission rates of tire wear on rubberized asphalt are 30-50% lower than they are on PCC. This is a comparison that represents the benefits of rubberized asphalt used as an overlay to extend the life of PCC freeways. No information was found to provide a similar comparison of benefits on arterial and local roads, which more typically use conventional asphalt.

Suggested Implementing Agency

This measure could be implemented by cities, towns, Maricopa County, and the Arizona Department of Transportation.

* Tire Wear Emissions from Asphalt Rubber and Portland Cement Concrete Pavement Surfaces, Arizona State University, Final Report, April 2006.

Cost

Information was requested on the marginal cost of resurfacing PCC with conventional asphalt or related maintenance procedures, but has not yet been received. According to ADOT, the average cost of laying rubberized asphalt is \$1.1 million per mile (6 lanes) or approximately \$183,333 per lane mile.

Emission Reduction

Assuming a freeway comparison with an average daily traffic (ADT) of 17,000 vehicles per lane mile, the emission reduction of using rubberized asphalt is estimated to be 0.034 tons per mile per year. At a lower ADT level of 2,500 vehicles per lane mile, the emission reduction drops to 0.005 tons per mile per year.

Cost Effectiveness

The cost effectiveness of resurfacing freeways with rubberized asphalt is estimated to \$630,882/ton of PM₁₀ reduced. Assuming similar resurfacing costs, the cost effectiveness for roads with lower ADT levels would be \$4,290,000/ton of PM₁₀ reduced.

Implementation Issues/Comments

While the cost effectiveness of this measure may be improved with information on the marginal cost of resurfacing with rubberized asphalt (i.e., versus other methods), the cost effectiveness of this measure is moot. This is because the Regional Transportation Plan (RTP)* includes commitments to fund mitigation projects which include rubberized asphalt overlays. Thus, this measure is already being implemented and credit for the emission reductions attributed to it should be credited toward the 5% per year emission reductions. Unfortunately, the emission benefits of this measure are limited due to the low emission rate of tire wear.

* 2006 Annual Report on the Status of the Implementation of Proposition 400, Maricopa Association of Governments, August 2006.

32. PAVE OR STABILIZE EXISTING UNPAVED PARKING LOTS

Unpaved parking areas contribute to the particulate pollution problem through two separate processes: (1) the production of fugitive dust as vehicles travel over an unpaved surface; and (2) trackout of material onto adjacent paved surfaces, including parking lots, driveways, and public roadways, where it is subsequently crushed by moving vehicles and re-entrained into the air by trailing vehicle wakes. Maricopa County has estimated that unpaved parking lots produced 3,009 tons or 3% of the PM₁₀ emitted annually within the nonattainment area in 2005. This estimate did not include any benefit for Rule 310.01; it assumes that emissions from unpaved parking lots are uncontrolled. While this may be an overestimate of the emissions, the recent analysis of Rule 310.01 effectiveness did not address unpaved parking lots (the focus instead was on vacant lots), so the level of enforcement in 2005 is unclear.

Currently Rule 310.01 requires the owner and/or operator of an unpaved lot to implement one of the following control methods:

- Pave;
- Apply dust suppressants; or
- Uniformly apply and maintain surface gravel.

The non-paving measures are subject to stabilization and opacity limitations; these limitations do not apply to paving. This measure would apply City of Phoenix zoning requirements for off-street parking to unpaved parking lots throughout the nonattainment area. All parking and maneuvering areas on residential, commercial and industrial property, with the exception of single-family homes or duplexes, would be required to have dustproof paving using one of the following options: asphaltic concrete, cement concrete, chip seal, or an equivalent. Single-family homes or duplexes can comply by applying a smooth layer of crushed rock or equivalent surface treatment.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

Cost was separately evaluated for paving and dust palliative application for non-single family homes or duplexes. Each alternative was evaluated for a 0.10-acre parking lot, which is the maximum size exempt from treatment under Rule 310.01. The annualized cost of paving, since paving is assumed to last for 25 years, is \$1,699/year. The annualized cost of dust palliatives, assuming annual grading and palliative application, is \$101 per year. No additional effort or cost was assumed to implement this rule.

Emission Reduction

The paving option is estimated to produce a reduction of 94 lbs of PM₁₀ per year. The palliative option is estimated to produce a reduction of 33 lbs of PM₁₀ per year.

Cost Effectiveness

Paving is estimated to have a cost effectiveness of \$18.10/lb or \$36,204/ton of PM₁₀ reduced; palliatives are estimated to have a cost effectiveness of \$3.06/lb or \$6,119/ton of PM₁₀ removed.

Implementation Issues/Comments

This analysis needs to be updated to include enforcement costs, because considerable effort would be required to achieve a high level of rule effectiveness.

33. PAVE OR STABILIZE EXISTING DIRT ROADS AND ALLEYS

Fugitive dust emissions occur whenever a vehicle travels over an unpaved surface. Unlike paved roads, however, the road is the source of emissions rather than any surface dust loading. Although unpaved roads and alleys generally receive much lower traffic than paved facilities, their greater PM₁₀ emission rate causes them to produce high levels of fugitive dust. Vehicles transitioning from unpaved to paved surfaces can also trackout material onto paved surfaces that can be re-entrained by subsequent traffic. Wind erosion of dust from unpaved surfaces can also add to the total fugitive dust emissions.

Maricopa County estimates that unpaved roads produce 8,490 tons or 9.3% of the PM₁₀ emitted within the nonattainment area in 2005. This estimate assumes that all commitments to pave unpaved roads contained in the Serious Area PM₁₀ Plan were implemented. No benefit from Rule 310.01 is included. This estimate assumes that emissions from unpaved roads are uncontrolled. While this may be an overestimate of the emissions, the recent analysis of Rule 310.01 effectiveness did not address unpaved roads (the focus instead was on vacant lots), so the level of enforcement in 2005 is unclear.

Currently, Rule 310.01 requires emissions from unpaved roads (including alleys) with traffic levels exceeding 150 vehicles per day to be controlled by one of the following methods:

- Pave;
- Apply dust suppressants; or
- Uniformly apply and maintain surface gravel.

The nonpaving measures are subject to stabilization and opacity limitations. These limitations are not applicable to unpaved roads that have been paved. This measure would extend Rule 301.01 requirements to unpaved roads with traffic levels below 150 vehicles per day.

Suggested Implementing Agency

This measure could be implemented by cities, towns, Maricopa County, and Arizona Department of Transportation.

Costs

No estimate of additional enforcement activity or cost is assumed to implement this measure. According to tests conducted in 1995 by MCDOT, the most cost effective palliative is Ligno 10, which has an annual cost of \$3,052/mile. The analysis assumes that four applications per year are required to provide sufficient control for high volume unpaved roads (i.e., 120 vehicles per day).

Emission Reduction

The MCDOT study computed a control efficiency of 67.3% compared to uncontrolled conditions when applied four times per year. This measure was assumed to be applied to the higher-traffic unpaved roads included in the 2005 Periodic Emission Inventory, which had traffic levels of 120 vehicles per day. This measure was estimated to produce a reduction in fugitive dust emissions of 21.7 tons per mile per year.

Cost Effectiveness

The overall cost effectiveness of this measure is estimated to be \$0.07/lb or \$141/ton.

Implementation Issues/Comments

Unlike Measure #5, no field effort is assumed to identify high-volume roadways for stabilization. Stabilizing roads will make it easier to drive faster and raise speed control and liability issues. Before this measure can be implemented, data on traffic volumes will have to be collected to identify candidate roads for stabilization.

34. LIMIT SPEEDS TO 15 MILES PER HOUR ON HIGH TRAFFIC DIRT ROADS

Dust emissions from unpaved road travel increase as vehicle speed increases. According to EPA's AP-42 emission factor for unpaved road travel, fugitive dust emissions increase by a factor of 1.41 (i.e., the square root of 2) when speed is doubled. The emission inventory developed by Maricopa County for 2005 assumes that vehicles traveled at an average speed of 25 mph on unpaved roads and produced 8,490 tons or 9.3% of the PM₁₀ emitted within the nonattainment area. At present, speeds on unpaved public roads are uncontrolled.

Regulated facilities are required to consider the impact of speed on fugitive dust emissions on unpaved roads. Rule 310 requires owners and/or operators of unpaved haul or access roads that have not been stabilized to limit vehicle speeds to no more than 15 miles per hour. This measure would extend those requirements to unpaved roads accessible to the public with traffic levels above 120 vehicles per day.

Discussions with MCDOT indicate that liability concerns moot the use of speed bumps to limit speeds and encourage the use of paved roads. Enforcement options therefore include installing signs posting speed limits at regular intervals (e.g., ¼ mile) and use of radar guns to measure speed of oncoming vehicles.

Suggested Implementing Agency

This measure could be implemented by cities, towns, Maricopa County, and Arizona Department of Transportation.

Cost

Costs were estimated for installing signs and enforcing speed limits on selected segments of high traffic (i.e., 120+ vehicles per day) unpaved county roads. The annualized signage cost assuming signs every ¼ mile with a useful life of 15 years is \$142/road mile per year. The annualized cost of enforcement assumes that a deputy sheriff with a radar gun monitors the selected unpaved roads and issues an estimated four tickets per day. The annualized enforcement cost is \$8,211/road mile per year.

Emission Reduction

The benefit of limiting speed from 25 mph to 15 mph on unpaved roads would be a 22.5% reduction in fugitive dust emissions. When applied to roads with more than 120 vehicles per day, this measure, which assumes an in-use compliance factor of 70%, would reduce fugitive dust emissions by 9.29 tons/road mile per year.

Cost Effectiveness

The overall cost effectiveness of this measure is estimated to be \$0.45/lb, or \$899/ton of PM₁₀ reduced.

Implementation Issues/Comments

MCDOT has concluded from past experience that the changing conditions of unpaved roads makes proper and realistic posting of speed limits “near impossible.” This position is consistent with what the state and other counties are doing.

35. PROHIBIT NEW DIRT ROADS, INCLUDING THOSE ASSOCIATED WITH LOT SPLITS

Unpaved roads are a significant source of fugitive dust emissions in the nonattainment area. Maricopa County estimates that unpaved roads produce 8,490 tons or 9.3% of the PM₁₀ emitted within the nonattainment area in 2005. While controls are required for existing unpaved roads, there is no prohibition on the construction of new unpaved roads or the expansion of existing unpaved roads.

Clark County began prohibiting the construction of new unpaved roads or alleys in public thoroughfares in calendar year 2000 unless the unpaved road is an interim component of an active paving project. San Joaquin Valley started prohibiting the construction of new unpaved roads in urban areas in 2004. New unpaved roads cannot be constructed in urban areas unless the road is to be used for a temporary activity that does not exceed six months of use over a consecutive three-year period. Temporary activities are defined to include construction access roads, special events, or traffic detours. The surface of roads meeting this definition must be maintained in a stabilized condition at all times in order to control fugitive dust emissions.

Each year funds are allocated for paving and stabilizing the existing inventory of unpaved roads. The implementation of this measure will place a cap on the growth of unpaved roads and ensure that emissions from vehicles operating on them will diminish over time.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

The only option evaluated for this measure is paving. The annualized paving cost is estimated to \$44,067/mile per year. This estimate includes costs for roadway excavation, aggregate base, asphalt paving, striping, and traffic control.

Emission Reduction

The emission benefit is 33,308 lbs/mile per year, or 16.7 tons/mile per year of PM₁₀ reduced.

Cost Effectiveness

The cost effectiveness is estimated to be \$1.32/lb of PM₁₀ reduced, or \$2,646/ton.

Implementation Issues/Comments

The high capital outlay for paving may encourage developers to instead opt to stabilize new roads and pass the long-term cost of maintenance onto home owners, which would then require additional enforcement effort to assure compliance.

36. PAVE OR STABILIZE UNPAVED SHOULDERS

Direct and indirect emissions from vehicle travel on the untreated shoulders of paved roads are a significant source of PM₁₀ emissions in the Maricopa County nonattainment area. Direct emissions are generated when vehicles travel on unpaved shoulders and when trucks moving at moderate speeds produce bow wakes that entrain loose dust on shoulder surfaces into the air. Indirect emissions are generated when vehicles crossing from unpaved shoulders onto paved lanes track soil onto the pavement that is subsequently crushed by vehicle tires and entrained into the air by trailing vehicle wakes.

Maricopa County Department of Transportation (MCDOT) recently completed an evaluation of several unpaved road shoulder control measures.* These measures were examined over a range of road classifications (i.e., local, collector, and arterial), and over a range of average daily traffic (ADT) levels. The analysis separately evaluated reductions to truck bow wake emissions and paved road re-entrained soil emissions from several applicable control measures, including dust palliative stabilization, gravel application, and paving.

The Serious Area PM₁₀ Plan included several measures to reduce paved road fugitive dust emissions, including, curbing, paving, and stabilizing unpaved shoulders on paved roads. Maricopa County included an estimate of the benefits of these measures in the 13,783 tons of PM₁₀ that paved roads emitted in the nonattainment area in 2005. The reduction attributed to these measures in paved road emissions was estimated to be 4%. This measure would make additional commitments, beyond those established in the Serious Area PM₁₀ Plan, to pave and stabilize the unpaved shoulders of additional miles of paved roads located within the nonattainment area.

Suggested Implementing Agency

This measure could be implemented by cities, towns, Maricopa County, and Arizona Department of Transportation.

Cost

The reader is referred to the above-referenced MCDOT report for information on the range of control measures assumed. Information here is limited to the most cost-effective

* Cost Effectiveness of Selected PM₁₀ Control Measures, Report No. SR2006-07-01, prepared for the Maricopa County Department of Transportation by Sierra Research, Inc. June 30, 2006.

measure presented in that analysis (measure 21b).^{*} The cost of 8-foot paved shoulders, with a useful life of 20 years, is \$25,104 per centerline mile year.

Emission Reduction

The selection of 8-foot paved shoulders is estimated to reduce fugitive dust emissions by 2,721 lbs per centerline mile year, or 1.36 tons per centerline mile year.

Cost Effectiveness

The overall cost effectiveness is \$9.23/lb of PM₁₀ reduced, or \$18,452/ton.

Implementation Issues/Comments

Research on bow wake emissions is limited and no study of control effectiveness for shoulder paving on bow wake emissions could be identified. Therefore, an estimate was prepared based on engineering judgment. Care should be exercised in relying on the benefits computed for this measure.

^{*} A decision was made not to reference the information for curb and gutter due to the high capital cost and the marginal increase in cost effectiveness relative to the 8-foot paved shoulder measure.

37. PAVE OR STABILIZE UNPAVED ACCESS TO PAVED ROADS

PM₁₀ emissions are produced indirectly by soil tracked out of construction or industrial sites onto paved, publicly maintained roads. Maricopa County estimates that paved roads produced 13,783 tons or 15% of the PM₁₀ emitted annually within the nonattainment area in 2005. Research supported by MAG has confirmed that trackout is a significant source of fugitive dust within the Salt River Basin and that its contribution to monitored values could be higher than suggested by the inventory estimates.

Currently, MCAQD Rule 310 requires trackout or spillage that exceeds 50 feet in length on public roads to be removed immediately. For visible trackout that is less than 50 feet in length, Rule 310 requires removal once per day at the end of working hours. To prevent trackout, owners are currently required to implement one of the following control measures:

- Install either a grizzly or wheel wash system at each access point;
- Install a gravel pad at least 30 feet wide, 50 feet long and 6 inches deep; or
- Pave from the point of access for a centerline distance of 100 feet and width of 20 feet.

Recent analysis of Rule 310 indicates that its effectiveness is on the order of 50% and suggests that there is an opportunity for improvement. This measure would make the trackout requirements of Rule 310 more restrictive by requiring the following:

- Reducing the length that requires rapid cleanup (i.e., 25 feet from any exit);
- Doubling the length of the gravel pad requirements (i.e., 100 ft); and
- Combining gravel pad and grizzly requirements (i.e., 50 ft gravel pad and 24 ft grizzly).

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

To simplify the calculations, it is also assumed that each facility has only one access point. Costs are presented below for each of the compliance options.

Rapid Cleanup	\$2,913 per access point/year
Doubled Gravel Pad	\$2,965 per access point/year
Gravel Pad & Grizzly	\$4,120 per access point/year

Emission Reduction

The benefit of the control options was estimated by first computing the amount of material that would be dropped by 40 heavy-duty trucks exiting a facility each day. The baseline estimate assumes that the access point is not currently being swept for any of the options.

The baseline for the Rapid Cleanup scenario also assumes that a 100-foot paved apron is in place. The control scenario assumes that the access point is swept every two hours during work hours. The benefit computed for this measure is estimated to be 215 lbs of PM₁₀ per access point per year.

The baseline of the Doubled Gravel Pad scenario assumes that the existing gravel pad is 50 feet long. The control scenario assumes that the pad is 100 feet long. The benefit computed for this measure is estimated to be 33 lbs of PM₁₀ per access point per year.

The baseline of the Gravel Pad & Grizzly scenario assumes that the existing gravel pad is 50 feet long. The control scenario assumes that the baseline gravel pad is combined with the 24-foot grizzly. The benefit computed for this measure is estimated to be 49 lbs of PM₁₀ per access point per year.

Cost Effectiveness

Rapid Cleanup	\$16.30/lb or \$32,593/ton per access point/year
Doubled Gravel Pad	\$89.57/lb or \$179,133/ton per access point/year
Gravel Pad & Grizzly	\$84.01/lb or \$168,025/ton per access point/year

Implementation Issues/Comments

The benefits of this measure are dependent on assumptions about the baseline compliance with Rule 310. This analysis assumed full compliance with Rule 310, which significantly deflates the amount of material that is tracked-out and inflates the cost effectiveness of the measure.

38. STRENGTHEN AND INCREASE ENFORCEMENT OF RULE 310.01 ON VACANT LOTS

There are over 4,000 vacant lots in the Maricopa PM₁₀ nonattainment area. To assure compliance with the requirements of Rule 310.01 on these lots will require an increase in the number of Maricopa County Air Quality Department (MCAQD) inspectors and increased trespass prevention actions by lot owners. To evaluate the cost effectiveness of this measure, we assumed that MCAQD would dedicate two inspectors solely to vacant lot inspections, and that owners of non-compliant lots would erect trespass barriers on these lots. We assumed that rock barriers, estimated to have the lowest installed cost for trespass prevention, would be the compliance method selected by more lot owners.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

Enforcement costs in this analysis include the salary and benefit costs of inspectors, and the costs of processing the Notices of Violation (NOVs) issued by inspectors. We assumed that each inspector would inspect 12 vacant lots per day and issue NOVs to the 32% that are estimated by the MCAQD 2007 rule effectiveness study to be out of compliance. On a per-vacant lot basis, these costs were estimated to total \$48.42 per lot per year. The average lot was estimated to be 3.0 acres in size, based on visual examination of a map of vacant lots in the Salt River area published in the Salt River PM₁₀ TSD. The cost of erecting a rock boulder barrier around a square lot of this size was estimated to cost \$11,400, from survey data also published in the TSD. A rock barrier was assumed to have a useful life of 20 years, which equated to an annualized capital cost of this construction of \$1,340 per year. The total cost of this measure was estimated to be \$1,390 per year per 3-acre vacant lot.

Emission Reduction

We assumed that the erection of a rock barrier would fully eliminate trespass emissions on a vacant lot. Since this cost effectiveness analysis is being conducted to evaluate control measures effective during winter, stagnant wind conditions, we did not evaluate windblown emissions from vacant lots which would also be reduced as a result of this measure. In the absence of any recorded data, we estimated that the average vacant lot received two trespass trips per week. This infrequent rate compares favorably with the

absence of trespass activity observed by MCAQD inspectors on vacant lots. The emissions from two weekly trips by light-duty vehicles were estimated to produce 11.6 pounds of PM₁₀ per year on a 3-acre vacant lot. Windblown emissions are estimated to be 75.8 pounds per year for this lot based on the assumption that the disturbed area is limited to a single 20-foot wide track across the parcel. By eliminating trespass trips, the emission reduction achieved by this measure would be 87.4 pounds of PM₁₀ per year per average vacant lot.

Cost Effectiveness

The cost effectiveness of this measure was calculated to be \$15.91 per pound, or \$31,814 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis used a very low vehicle trespass rate on vacant lots. If monitoring of trespass activities on vacant lots shows that trespass frequencies are higher, the emission reductions would be greater and the cost effectiveness would also improve.

39. RESTRICT VEHICULAR USE AND PARKING ON VACANT LOTS

This measure is very similar to Measure #38, Strengthen and Increase Enforcement of Rule 310.01 for Vacant Lots. Under this measure, costs are limited to those needed to restrict vehicular access to vacant lots. To evaluate the cost effectiveness of this measure, we assumed that the owner of a vacant would use the lowest cost method available to construct a barrier around a typical lot in order to completely prevent vehicle access. From analyses published in the Salt River PM₁₀ SIP prepared by the ADEQ, we assumed that the installation of a rock boulder barrier would be the least expensive method of securing a vacant lot.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The cost of installing a rock boulder barrier was estimated to cost \$7.90 per linear foot, based on a survey conducted by ADEQ in support of the Salt River SIP. For the purpose of this analysis, we assumed that the average vacant lot covered 3.0 acres. This value was estimated from evaluation of the vacant lot map for the Salt River area published in the Salt River SIP. We assumed that such a lot would be square, and thus have a perimeter of 1,446 linear feet. We estimated that the useful life of a rock boulder barrier would be 20 years, and calculated the annualized cost of this installation at a 3.0-acre square lot to be \$1,342 per year.

Emission Reduction

We assumed that the erection of a rock barrier would fully eliminate trespass emissions on a vacant lot. Since this cost effectiveness analysis is being conducted to evaluate control measures effective during winter, stagnant wind conditions, we did not evaluate windblown emissions from vacant lots which would also be reduced as a result of this measure. In the absence of any recorded data, we estimated that the average vacant lot received two trespass trips per week. This infrequent rate compares favorably with the absence of trespass activity observed by MCAQD inspectors on vacant lots. The emissions from two weekly trips by light-duty vehicles were estimated to produce 11.6 pounds of PM₁₀ per year on a 3-acre vacant lot. By eliminating trespass trips, the emission reduction achieved by this measure would be 11.6 pounds of PM₁₀ per year per

average vacant lot. Windblown emissions are estimated to be 75.8 pounds per year for this lot based on the assumption that the disturbed area is limited to a single 20-foot wide track across the parcel. By eliminating trespass trips, the emission reduction achieved by this measure would be 87.4 pounds of PM₁₀ per year per average vacant lot.

Cost Effectiveness

The cost effectiveness of this measure was calculated to be \$15.35 per pound, or \$30,706 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis used a very low vehicle trespass frequency on vacant lots. If monitoring of trespass activities on vacant lots shows that trespass frequencies are higher, the emission reductions would be greater and the cost effectiveness of this measure would also improve.

40. ENHANCED ENFORCEMENT OF TRESPASS ORDINANCES AND CODES

Under this measure, trespass violations of Rule 310.01 would be reduced by increased enforcement of rule requirements. Interviews with law enforcement agencies indicated that enforcement would not be practical unless each vacant lot was posted with “no trespassing” signs. We also assumed that enforcement of the measure would not be effective unless law enforcement officers were specifically dedicated to patrolling and issuing tickets to trespass violators. As a result, we assumed that the cost elements of this measure would include the installation of signs on vacant parcels, and the assignment of law enforcement officers solely to enforcement of the trespass requirements of Rule 310.01.

Suggested Implementing Agency

This measure would be implemented by Maricopa County and the cities and towns within the PM₁₀ nonattainment area.

Cost

Information on the costs of sign installation and law enforcement costs were obtained from the Maricopa County Department of Transportation (MCDOT) and from the Salt River PM₁₀ SIP prepared by the ADEQ. We assumed that “no trespassing” signs would have to be installed every 200 feet along the boundary of a vacant lot in order to withstand legal challenges that trespassers were properly notified of applicable ordinances, and that the cost of sign installation would be \$200 per sign. To post the entire perimeter of an average 3-acre parcel, the total cost of sign installation would be \$1,456. We assumed that these signs would have a useful life of 15 years, and calculated the annualized cost of this installation to be \$191.43 per 3-acre lot. To enforce the “no trespassing” ban, we estimated that two Maricopa County Deputy Sheriffs, or equally compensated police officers, working as a team in one vehicle would be required. The annual cost of these resources was estimated in the Salt River PM₁₀ SIP to be \$126,945 per year. Distributed over the 4,000 vacant lots within the nonattainment area, this cost would equate to \$31.74 per vacant lot. The costs of processing infraction tickets issued by the officers were estimated to cost \$1.81 per vacant lot per year. Total costs of sign installation and rule enforcement were calculated from these estimates to be \$224.97 per vacant lot per year.

Emission Reduction

We assumed that the installation of signs and enforcement of a trespass prohibition with substantial fines would result in a 75% reduction in direct trespass emissions, not counting any reductions in windblown emissions of disturbed surfaces. Assuming that trespass rates are now on the order of two trips per week per vacant lot, this compliance level would result in estimated emission reductions on a 3-acre vacant lot of 8.72 pounds of PM₁₀ per year. Windblown emissions are estimated to be 75.8 pounds per year for this lot based on the assumption that the disturbed area is limited to a single 20-foot wide track across the parcel. Based on the rule effectiveness analysis of Rule 310.01, it is assumed that normal vacant lot inspections will achieve 68% control of windblown emissions. By reducing trespass trips and windblown emissions, the emission reduction achieved by this measure would be 56.52 pounds of PM₁₀ per year per average vacant lot.

Cost Effectiveness

The overall cost effectiveness of this measure was calculated to be \$3.98 per pound, or \$7,961 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

The number of law enforcement personnel needed to enforce the applicable requirements of Rule 310.01 at a 75% compliance level is uncertain. We have assumed in this analysis that the use of two officers in a single vehicle with the authority to issue tickets with substantial penalties would be sufficient to induce compliance if the prohibition and penalty is widely advertised. If a public information campaign is not mounted, then the compliance rate and emission reductions will be lower. This analysis used a very low vehicle trespass frequency on vacant lots. If monitoring of trespass activities on vacant lots shows that trespass frequencies are higher, the emission reductions would be greater and the cost effectiveness of this measure would also improve.

41. VACANT LOTS STABILIZED BY COUNTY IF OWNERS DO NOT RESPOND, LIENS PUT ON PROPERTY IF NECESSARY

This measure is similar to Measure #38, Strengthen and Increase Enforcement of Rule 310.01 for Vacant Lots. Under this measure, the county would install a trespass barrier on any vacant lot when the owner failed to do so, and a lien would be placed against the property to ensure reimbursement to the county. For this analysis, we assumed that an average vacant lot covered 3.0 acres, as estimated from a map of vacant lots in the Salt River area as published in the Salt River PM₁₀ SIP prepared by the ADEQ. From this document, we also obtained a cost estimate for rock boulder barriers, which we concluded was the least expensive method of preventing vehicle trespass onto vacant lots.

Suggested Implementing Agency

This measure would be implemented by Maricopa County.

Cost

The cost of installing a rock boulder barrier was estimated to cost \$7.90 per linear foot, based on a survey conducted by ADEQ in support of the Salt River SIP. For the purpose of this analysis, we assumed that the average vacant lot covered 3.0 acres and, for the purpose of this analysis, was square with a perimeter of 1,446 linear feet. We estimated that the useful life of a rock boulder barrier would be 20 years, and calculated the annualized cost of this installation on a 3.0-acre square lot to be \$1,342 per year. We estimated the cost of recording a lien on a vacant lot to be \$177.62, based on county legal salaries and benefits, and that a lien would remain in place for an average of 10 years. The annualized cost of a lien was calculated to be \$28.91 per vacant lot per year. The total annual cost of this measure was estimated to be \$1,371 per vacant lot per year.

Emission Reduction

We assumed that the erection of a rock barrier would fully eliminate trespass emissions on a vacant lot. Since this cost effectiveness analysis is being conducted to evaluate control measures effective during winter, stagnant wind conditions, we did not evaluate windblown emissions from vacant lots which would also be reduced as a result of this measure. In the absence of any recorded data, we estimated that the average vacant lot received two trespass trips per week. This infrequent rate compares favorably with the absence of trespass activity observed by MCAQD inspectors on vacant lots. The

emissions from two weekly trips by light-duty vehicles were estimated to produce 11.6 pounds of PM₁₀ per year on a 3.0-acre vacant lot. By eliminating trespass trips, the emission reductions achieved by this measure would be 11.6 pounds of PM₁₀ per year per average vacant lot. Windblown emissions are estimated to be 75.8 pounds per year for this lot based on the assumption that the disturbed area is limited to a single 20-foot wide track across the parcel. By eliminating trespass trips, the emission reduction achieved by this measure would be 87.4 pounds of PM₁₀ per year per average vacant lot.

Cost Effectiveness

The cost effectiveness of this measure was calculated to be \$15.68 per pound, or \$31,367 per ton, of PM₁₀ reduced.

Implementation Issues/Concerns

This analysis used a very low vehicle trespass frequency on vacant lots. If monitoring of trespass activities on vacant lots shows that trespass frequencies are higher, the emission reductions would be greater and the cost effectiveness of this measure would also improve.

42. SCHEDULE IMPROVEMENTS ON PARALLEL STREETS TO RETAIN ALTERNATE ROUTE OPTIONS ALONG MAJOR NORTH/SOUTH AND EAST/WEST CORRIDORS

Road improvements typically add capacity to facilitate the efficient flow of traffic. Improvements can include enhancements in signalization and turning capacity, the addition of grade separation, transit turnouts and bike lanes and capacity increases. The addition of improvements along parallel streets provides routing flexibility in times of increased congestion so that speeds do not deteriorate. Fugitive dust on paved roads, tire wear and brake wear are not influenced by vehicle speed. Since this measure does not reduce travel it has no impact on any of those categories of emissions. Vehicle exhaust emissions are influenced by average speed. While speed has a significant impact on hydrocarbons, carbon monoxide and nitrogen oxide emissions, it has a limited impact on exhaust PM₁₀ emissions. Sulfate is the only component of exhaust PM₁₀ impacted by speed; it however, accounts for less than 10% of exhaust PM₁₀ emitted from motor vehicles.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

While no estimate of the cost of implementing this measure is available; it should be noted that infrastructure improvements are expensive.

Emission Reduction

Motor vehicles are estimated to have emitted a total of 1,041 tons of PM₁₀ in 2005 and account for 1% of the nonattainment inventory. While no estimate of the fraction of travel impacted by this measure is available, it is clear that the impact of this measure on the level of PM₁₀ emitted from motor vehicles will be a very small portion of the inventory.

Cost Effectiveness

No estimate of the cost effectiveness of this measure is available.

Implementation Issues/Comments

The potential benefit of this measure is extremely limited and the cost effectiveness per ton of PM₁₀ reduced would be very expensive. This measure also has the potential to induce travel which could eliminate any of the PM₁₀ reductions.

43. BUILD PARK AND RIDE LOTS EARLIER

According to EPA,^{*} park-and-ride facilities are an important element of all high-occupancy vehicle (HOV) programs. They serve as a collection point for individuals transferring to another vehicle containing at least one other person. Park-and-ride lots generally are designed to serve bus or rail transit, but also can be developed to facilitate carpooling, vanpooling, use of various types of shuttle services, and combinations of these high-occupancy vehicles. Park-and-ride facilities may be dedicated lots on public property or joint-use lots on privately owned property where the normal parking function is not oriented toward modal transfer, such as at shopping centers or churches. The size of park-and-ride facilities varies widely—from only a few spaces in sparsely populated or less heavily travelled corridors to lots of many hundreds of spaces serving major rapid transit lines.

Nearly all major metropolitan areas and many rural areas have implemented some form of park-and-ride program to provide support facilities for transit, congestion relief, or as staging areas for ridesharing. Often, these facilities are developed according to a plan based on predetermined implementation criteria which provides for a systematic program of investment and implementation, also addressing demand for service. On the other hand, some park-and-ride facilities are developed simply as a means of reducing ad hoc parking at particular locations where property may be available.

The 2006 Update of the Regional Transportation Plan (RTP)[†] has allocated funds to construct park-and-ride facilities in fiscal years 2007 and 2008. This measure calls for constructing these facilities in earlier years.

Suggested Implementing Agency

This measure would be implemented by the Maricopa Association of Governments, Maricopa County and cities and towns.

Cost

According to the 2006 RTP Update funds in the amount of \$3 million have been allocated for fiscal year 2007 and for fiscal year 2008 for construction of park-and-ride facilities.

^{*} <http://www.epa.gov/otaq/stateresources/policy/transp/tcms/park-fringepark.pdf>

[†] http://www.mag.maricopa.gov/pdf/cms.resource/2006_RTP_update-final_book95739.pdf

Emission Reduction

No estimate of the reduction in PM₁₀ emissions for the proposed facilities is available. Park-and-ride facilities reduce travel by facilitating the use of transit and carpools. The reduction in travel produces a reduction in both exhaust and fugitive dust emissions. The benefits for this measure, however, would only accrue to the years in which the park-and-ride lots would not have been constructed (which according to the RTP would be years prior to 2007 and 2008). A review of the literature, however, shows that transit buses have PM₁₀ drawbacks.

- Transit bus exhaust PM₁₀ emissions are almost 100 times higher than PM₁₀ emissions from light-duty vehicles (passenger cars and light-duty trucks). This estimate is based on a comparison of vehicle class emission estimates from EPA's mobile source emission factor model MOBILE6.2. The exhaust emissions increase could be diminished or offset through the use of lower sulfur fuel and/or particulate traps.
- An analysis of fugitive dust emissions from transit buses versus light-duty vehicles indicates that a typical bus when fully loaded (i.e., 100% ridership) will reduce PM₁₀ emissions by 20% relative to an equivalent number of passenger car trips. The analysis also shows that if the bus ridership drops below 75%, car trips will produce lower levels of PM₁₀ than a single bus trip. The problem is that transit buses are significantly heavier than cars and the weight term of the fugitive dust equation for paved roads increases in a nonlinear manner.

If carpools are used instead of transit buses at park-and-ride lots, reductions in both exhaust and fugitive dust emissions will be achieved.

Cost Effectiveness

While no specific estimate of the cost effectiveness of park-and-ride lots is available, the information presented above suggests that the reduction in PM₁₀ emissions is likely to be quite limited and the cost effectiveness of that reduction will be extremely expensive.

Implementation Issues/Comments

Transit (including park-and-ride lots) is an extremely expensive form of pollution control. It has high fixed and operational expenses, and if they are fully allocated to reduce emissions, the cost effectiveness is expensive in terms of \$/ton reduced. Transit is typically used as an ozone and/or carbon monoxide (CO) control measure, not as a fugitive dust control measure.

44. COORDINATE PUBLIC TRANSIT SERVICES WITH PINAL COUNTY

Public transit is an important component of the regional transportation system. The 2006 Update of the Regional Transportation Plan (RTP)* has allocated about 32% of regional funding to transit related projects. As part of the RTP, a regional bus network is funded; including operating costs, to ensure that reliable service is available on a continuing basis. In addition, light rail corridors are to be constructed to provide a high-capacity backbone for the transit network. Other transit services are included to provide a full range of options, such as paratransit and rural transit service. In addition to the regionally funded elements, local bus services will be funded by individual jurisdictions to supplement regional services.

Discussions with Pinal County staff confirmed that the County has no transit service at this time. Maps presenting planned service improvements in the RTP contain footnotes stating that “Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).” Valley Metro and ADOT provide support for the formation and maintenance of carpools in Pinal County.

Suggested Implementing Agency

This measure would be implemented by the Maricopa Association of Governments, Pinal County and CAAG.

Cost

No funds have been allocated for transit in Pinal County therefore it is not possible to determine a cost for the coordination proposed in this measure.

Emission Reduction

No estimate of the reduction in PM₁₀ emissions is available for this measure. As noted in the discussion of Measure #43, transit buses have PM₁₀ drawbacks.

- Transit bus exhaust PM₁₀ emissions are almost 100 times higher than PM₁₀ emissions from light-duty vehicles (passenger cars and light-duty trucks). This estimate is based on a comparison of vehicle class emission estimates from EPA’s

* http://www.mag.maricopa.gov/pdf/cms.resource/2006_RTP_update-final_book95739.pdf

mobile source emission factor model MOBILE6.2. The exhaust emissions increase could be diminished or offset through the use of lower sulfur fuel and/or particulate traps.

- An analysis of fugitive dust emissions from transit buses versus light-duty vehicles indicates that a typical bus when fully loaded (i.e., 100% ridership) will reduce PM_{10} emissions by 20% relative to an equivalent number of passenger car trips. The analysis also shows that if the bus ridership drops below 75%, car trips will produce lower levels of PM_{10} than a single bus trip. The problem is that transit buses are significantly heavier than cars and the weight term of the fugitive dust equation for paved roads increases in a nonlinear manner.

Cost Effectiveness

The information presented above suggests that the reduction in PM_{10} emissions associated with improved transit service is likely to be quite limited and the cost effectiveness of that reduction will be extremely expensive.

Implementation Issues/Comments

Transit (including park-and-ride lots) is an extremely expensive form of pollution control. It has high fixed and operational expenses, and if they are fully allocated to reduce emissions, the cost effectiveness is expensive in terms of \$/ton reduced. Transit is typically used as an ozone control measure, not as a fugitive dust control measure.

45. INCREASE FINES FOR OPEN BURNING

The Maricopa County regulates all open outdoor fires.* The purpose of the program is to limit the emissions of air contaminants that are produced from open burning. Any burning of material outdoors (where a flue or chimney is not used) is generally prohibited unless it is one of the following exempt processes:

1. Domestic cooking for immediate human consumption.
2. Warmth for human beings.
3. Recreational purposes, where the burning material is clean, dry wood or charcoal.
4. Branding animals.
5. Orchard heaters for frost protection in farming or nurseries.
6. Disposal of dangerous materials.
7. Fire extinguisher training – limited to small fires in a small container, such as a wastebasket.
8. Testing potentially explosive or flammable products in accordance with the Department of Transportation or Defense guidelines.
9. Testing potentially explosive-containing products for commercial, military, and law enforcement uses.
10. Fire fighting training areas and training structures when the sole source of flame is a burner fueled by LP gas or natural gas.

The penalty for an unpermitted open burn is set in ARS 49-501 Unlawful Open Burning; Definition; Exceptions; Fine.† Any violation is punishable by a fine not to exceed \$25. Discussions with Maricopa County inspectors and enforcement staff indicate that the amount of the fine is insufficient to deter the behavior of repeat offenders.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

Cost

No estimate of the cost of implementing this measure is available.

* http://www.maricopa.gov/qa/divisions/compliance/dust/open_burning/Default.aspx

† <http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/49/00501.htm&Title=49&DocType=ARS>

Emission Reduction

The 2005 PM₁₀ emission inventory estimates that open burning produces 11.5 tons/year of PM₁₀. This source category represents 0.013% of the inventory for the nonattainment area. This estimate, however, only accounts for emissions from permitted burns; no estimate of the emissions produced by unpermitted burns is included in the inventory. Discussions with Maricopa County indicate that they have no data on the frequency of occurrence of unpermitted open burns. A review of their complaint files indicates that the number of complaints is roughly double the number of permitted burns. Assuming the same amount of material is burned in unpermitted burns and the complaints quantify the extent of the activity, the level of PM₁₀ emitted is roughly 23 tons/year and accounts for a very small portion of the inventory.

Cost Effectiveness

No estimate of the cost effectiveness of this measure is available.

Implementation Issues/Comments

Despite the limited emissions benefit of this measure, it is important to note that open burning has been observed in the Salt River on days when the ambient standard has been exceeded. One was observed at the facility located next to the 43rd Avenue monitoring site. Discussions with Maricopa County staff indicate that some facilities in the Salt River area are repeat offenders and are undeterred by \$25 fines.

A statute change is required to implement this measure.

46. RESTRICT USE OF OUTDOOR FIREPLACES AND AMBIENCE FIREPLACES IN THE HOSPITALITY INDUSTRY

Wood burning in Maricopa County is governed by a mixture of ordinances and rules. The goal of this measure is to close loopholes within this regulatory structure that allow some wood burning activity to continue on high pollution advisory (HPA) days. ARS 9-500.16^{*} requires cities and towns to adopt, implement and enforce ordinances that prohibit the installation or construction of a fireplace or wood burning stove after 1998 unless it meets clean burning standards (e.g., gas or electric log, EPA certification, etc.). The statute, however, allows flexibility for ordinances to provide exemptions for industrial equipment, cooking devices and outdoor fireplaces.

The Maricopa County Residential Woodburning Restriction Ordinance[†] restricts residential wood burning in a non-approved device (which is generally pre-1998 stoves, etc.) when monitoring or forecasting indicates that carbon monoxide (CO) and/or particulate standards are likely to be exceeded between October 1st and February 29th. The rule applies to woodburning devices that heat the interior of residences. Barbecue devices, fire pits or mesquite grills are specifically exempted.

Maricopa County Rule 318[‡] sets standards for residential woodburning devices that may be exempted from the restrictions established in the Residential Woodburning Restriction Ordinance. Approved woodburning devices include EPA-certified stoves, pellet stoves, gas burning appliances and masonry heaters that meet EPA performance standards. The rule applies to all residences, defined to include single and multiple dwellings, motels, hotels, dormitories, etc. Woodstoves, woodheaters or conventional woodstoves are defined to not include a barbecue device, a cookstove, a boiler or a furnace. It is not clear whether it addresses outdoor fireplaces or pits. Ambience fireplaces in the hospitality industry do appear to be covered.

Suggested Implementing Agency

This measure would be implemented by Maricopa County, cities and towns.

^{*} <http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/9/00500-16.htm&Title=9&DocType=ARS>

[†] http://maricopa.gov/qa/divisions/planning_analysis/rules/docs/rwro9911.pdf

[‡] http://maricopa.gov/qa/divisions/planning_analysis/rules/docs/318-9904.pdf

Cost

No estimate of the cost of implementing this measure is available.

Emission Reduction

Emissions from outdoor fireplaces, pits and the hospitality industry are not included in the PM₁₀ inventory. Residential woodburning is estimated to produce 231.2 tons/year of PM₁₀ emissions in the nonattainment area and account for 0.25% of the inventory. The activities targeted by this measure are expected to represent a fraction of this category of emissions. Therefore, the emission reductions attributed to this measure will be small.

Cost Effectiveness

The Most Stringent Measure Analysis* evaluated two relevant woodburning control measures. The cost effectiveness estimates for the measures are:

- Retrofit existing fireplaces and woodstoves – \$190,000/ton of PM₁₀ removed; and
- Curtailment of woodheating – \$132,000/ton of PM₁₀ removed.

Implementation Issues/Comments

Revisions to ARS 9-500.16 and Maricopa County Rules would be required to implement this rule. Current penalties imposed under the Maricopa County Residential Woodburning Restriction Ordinance are \$50 for the second violation and \$100 for the third and subsequent violations. It is unclear if these fines need to be revised to support the implementation of this measure.

* Most Stringent PM₁₀ Control Measure Analysis, prepared for Maricopa Association of Governments by Sierra Research, May 13, 1998.