

STATIONARY & AREA SOURCE SUBCOMMITTEE

Revised Final Report Based Upon Summit Action

Prepared for:

The Governor's Brown Cloud Summit

by the Arizona Department of Environmental Quality

December 8, 2000

Control Measures

Stationary and Area Source Subcommittee

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Group 1 Control Measures

Recommended by the Stationary and Area Source Subcommittee

Measure	Worst 20% Average Winter Day		Annual Average Day		Effectiveness Score
	Visibility Improvement in year 2020 (deciview)	Cost Benefit in Millions of dollars (Levelized Annual Cost per deciview Change)	Visibility Improvement in year 2020 (deciview)	Cost Benefit in Millions of dollars (Levelized Annual Cost per deciview Change)	
Ban Leaf Blowers					1
• Fugitive Dust	0.13	\$ 1.45	0.14	\$ 1.32	
• Fuel Combustion Emissions	0.03	\$ 6.17	0.03	\$ 6.60	
Additional Funding for PM10 Efficient Street Sweepers	0.05	\$ 19.90	0.06	\$ 17.14	2
Replace Generators with Electric Power at Construction Sites	0.05	\$ 52.32	0.04	\$ 68.08	3
Increase Funding for County Inspection and Dust Control Program	0.03	\$ 19.65	0.04	\$ 16.19	4
Dust Control Training for Contractors	0.01	\$ 1.88	0.01	\$ 1.55	5
Expansion of Area A					6
• Wood burning restriction	0.0016	\$ 203.70	0.0015	\$ 223.57	
• Gasoline vehicle exhaust	0.0012	\$ 1,265.00	0.0011	\$ 1,408.95	
Air Quality Alert Days					7
• Wood burning restriction	0.0005	\$ 147.29	0.0002	\$ 441.59	
• Gasoline vehicle exhaust	0.0016	\$ 43.95	0.0014	\$ 48.94	
Controls for Stationary Reciprocating Internal Combustion Engines	0.002	\$ 7.61	0.001	\$ 12.39	8

Title: Ban Leaf Blowers
Origin: Report of the Governor's Air Quality Strategies Task Force, Feb. 1998
Pollutant(s): PM₁₀, PM_{2.5}, Elemental and Organic Carbon, NO_x, VOCs
Category: Stationary and Area Source
Geographic Area: Area A

Description

This measure would ban the use of all leaf blowers in Area A.

Background

Leaf blowers resuspend particulate matter into the air and also generate VOC and CO emissions. A ban on all leaf blowers would reduce emissions of these pollutants, as well as neighborhood noise.

Sectors Affected

Lawn and Garden Equipment Exhaust

Effectiveness of Measure

In 1997 Sierra Research estimated that this measure would reduce PM₁₀ emissions by 3.74 metric tons per day (0.008 tons per day per unit). Recent estimates utilizing emission factors developed by CARB ("A Report to the California Legislature on the Potential Health and Environmental Impacts of Leaf Blowers", California Air Resources Board, February 29, 2000), found the measure would result in the following reductions:

Combustion of fuel (in tons per day)

- hydrocarbons - 1.31
- NO_x - 0.004
- PM_{2.5} - 0.0115
- CO - 3.83
- PM₁₀ - 0.0006

Fugitive particulate emissions (in tons per day)

- PM₁₀ - 4.6
- PM_{2.5} - 2.18

Assumptions made in the estimate include:

- 95% of combustion particulate is PM_{2.5} or less.
- Electric blowers make up 5% of commercial blower population.
- Estimate of 50000 blowers in 2000 based upon growth of 1992 inventory of non-road equipment to a Maricopa County population of 3.1 million.
- Estimated that 6% of blowers are in operation on any day with an average operation of 2 hours.
- Equipment population data source: "1992 nonroad emission inventories for CO and ozone nonattainment boundaries Phoenix, Arizona (EPA 1992)".

- Resuspended emission factors based upon average Riverside, California, silt loading.

Cost of the Measure

The Sierra research estimated cost effectiveness of \$216 per metric ton was utilized in the recent analysis. City of Mesa estimated that substitute methods to the use of leaf blowers may increase commercial landscape contract costs by 15 to 30 percent.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Fuel Combustion Emissions

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.43	0.43	0.43	0.43	0.43
Standard Visual Range Improvement (Km)	0.00	0.1	0.1	0.1	0.1	0.1
Haziness Improvement (Deciview)	0.00	0.03	0.03	0.03	0.03	0.03
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	0.18	0.18	0.18	0.18	0.18	0.18
Levelized Annual Total Cost (\$ Millions/year)						0.18
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	6.58	6.14	5.86	5.91	6.17

Fugitive Dust Emissions

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	1.83	1.83	1.83	1.83	1.83
Standard Visual Range Improvement (Km)	0.00	0.3	0.3	0.4	0.4	0.3
Haziness Improvement (Deciview)	0.00	0.12	0.13	0.13	0.13	0.13
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	0.18	0.18	0.18	0.18	0.18	0.18
Levelized Annual Total Cost (\$ Millions/year)						0.18
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	1.55	1.44	1.37	1.39	1.45

Implementation Mechanism

The State Legislature would enact this measure into law.

Period for Implementation

If legislation was enacted in 2001, the program could take effect in 2002 or 2003 depending on the need for rulemaking activities.

Barriers to Implementation

During previous attempts to introduce legislation, the lawn maintenance community strongly voiced their opposition to any restrictions on the use of landscaping equipment.

Lawn maintenance firms would require additional manpower to replace the blowers because debris sweeping and raking are more time intensive than blowing debris. This could increase the cost of lawn maintenance to the consumer. However, if the ban were enforced regionally (i.e. Area A), market conditions would likely limit cost increases. Because of the large number of units currently in use, enforcement may be difficult.

Affected Parties

- Local governments
- Lawn maintenance companies
- Public

Title: Additional Funding for PM₁₀ Efficient Street Sweepers
Origin: Brown Cloud Summit; Stationary and Area Source Subcommittee
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description

This measure would provide additional funding to purchase PM₁₀ efficient street sweepers.

Background

This measure would provide funds, in addition to Congestion Mitigation Air Quality (CMAQ) funds allocated by the Maricopa Association of Governments (MAG), to encourage the purchase and utilization of PM₁₀ efficient street sweepers to reduce particulate emissions from paved roads. The objective of this measure is to accelerate the number of PM₁₀ efficient units used to sweep roads in the Area A that have heavy silt loadings.

The FY 2001-2005 MAG Transportation Improvement Program (TIP) contains CMAQ funding to purchase PM₁₀ certified street sweepers for FY 2001-2005. The funding levels are \$960,000 per year in 2001 through 2004 and \$1.92 million in 2005. A minimum local match of 5.7% is required. It is estimated that approximately 48 sweepers can be purchased with available funds.

The revised MAG 1999 Serious Area Particulate Plan for PM₁₀ for the Maricopa Nonattainment Area contains a committed control measure to encourage the purchase and utilization of PM₁₀ efficient street sweepers. The commitment indicates that for each fiscal year CMAQ funds are allocated for street sweepers. The commitment also indicated that MAG will coordinate a test in 2000-2001 to assess the applicability of certified street sweepers to specific conditions in the Maricopa County PM₁₀ nonattainment area and address operational concerns of the MAG member agencies. MAG has allocated \$70,000 to conduct the testing.

Eligible street sweepers are defined as those which have been certified by the South Coast Air Quality Management District as meeting the PM₁₀ emission requirements of Rule 1186.

Sectors affected

Paved road dust

Effectiveness of Measure

MAG estimated that each PM₁₀ efficient street sweeper would provide a reduction of 334 kilograms per day (0.368 tons per day) of PM₁₀. Assuming the addition of 40 PM₁₀ efficient street sweepers by 2006,

the total daily reduction of PM₁₀ would be 14.72 ton per day of PM₁₀ and 2.9 tons per day of PM_{2.5} (assuming that PM_{2.5} emissions are 20% of the total PM₁₀ emissions).

Cost of the Measure

This measure assumes additional funding to match the CMAQ funding levels described above. This level of funding would result in approximately 40 additional efficient street sweepers at a cost of \$6 million dollars between 2001 and 2006 (annual cost is estimated to be \$960,000 plus the 5.7% match required by cities, or approximately one million dollars per year).

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.73	0.73	0.73	0.73	0.73
Standard Visual Range Improvement (Km)	0.00	0.1	0.1	0.1	0.1	0.1
Haziness Improvement (Deciview)	0.00	0.05	0.05	0.05	0.05	0.05
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	6.0	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	-	-	-	-	-
Levelized Annual Total Cost (\$ Millions/year)	0.09					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	21.24	19.80	19.90	19.08	19.90

Implementation Mechanism

An adequate source of funding for the additional PM₁₀ efficient street sweepers would need to be located.

Period Required for Implementation

The program could be implemented upon availability of funding.

Barriers to Implementation

Locating an adequate source of funds.

Affected Parties

- Municipalities
- Maricopa County
- Taxpayers

- MAG
- ADOT

Title: Replace Generators with Electric Power at Construction Sites
Origin: 1998 Governor's Air Quality Task Force
Pollutant(s): PM₁₀, PM_{2.5}, NO_x, VOC
Category: Stationary and Area Source
Geographic Area: Area A

Description

This measure would mandate that utility supplied electrical power be provided at residential and commercial construction sites in lieu of portable or diesel generators.

Background

In 1998, the Task Force recommended establishing an incentive based or voluntary demonstration program for use of temporary, utility-supplied, electrical power at residential construction sites in lieu of portable gasoline or diesel generators. Discouraging the use of fuel-fired generators reduces this source of combustion emissions and noise. While Arizona utilities have offered temporary electrical power at construction sites for several years, demand for the services has been relatively low. This is partly because contractors are not well informed of the cost, convenience, and advantages of utilizing temporary power.

In 1998, the measure was proposed as a voluntary program until January 1, 2000, at which time the Executive Branch was to decide whether the program should continue to be voluntary or whether it should be transition to a mandatory program.

From January 1998 through October 1998, SRP averaged 40 installations of these devices per month. These devices are typically installed for three months. It was projected there were 500 installations in 1998. SRP is currently working to provide an update regarding the participation level in this program to date.

Similar records are not currently available from APS.

Sectors Affected

Construction exhaust (gasoline and diesel fueled)

Effectiveness of Measure

The cost effectiveness for each affected pollutant, as estimated by in the 1998 Task Force Report, is listed below:

Pollutant	Estimated Annual Reduction (tons/year)	Cost Effectiveness (\$/tons reduced)
CO	1,292	\$348
VOC	29.3	\$15,360
PM ₁₀	1.2	\$374,000

The emission reduction estimates are based on the net difference between emissions from fuel-fired portable generators and emissions resulting from generation of an equivalent amount of electricity by utility power plants. Relative costs for temporary electrical power connections and on-site generation may differ depending on the location and size of the site.

The Home Builders Association of Central Arizona provided information on the number of new home starts in Maricopa County.

Year	Number of New Home Starts in Maricopa County
1999	35,300
2000	33,000
2003	30,000
2005	32,000

Cost of the Measure

Arizona utility companies estimate the cost of installation and electricity usage to be less than \$100 per home. Assuming the average number of homes built in the Phoenix area per year is 30,000, and an estimated 80% compliance rate which results in 24,000 homes per year, the cost of the program is \$2.4 million per year. Direct costs would be borne by homebuilders.

The current measure is voluntary. Homebuilders can request installation of temporary power at construction sites by calling their local utility. The 1998 measure suggested that APS and SRP disseminate information about this option to homebuilders and contractors. SRP's marketed the program through distribution of literature. APS stated that their program was informal.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.16	0.91	0.71	0.66	0.67
Standard Visual Range Improvement (Km)	0.00	0.00	0.2	0.1	0.1	0.1
Haziness Improvement (Deciview)	0.00	0.01	0.06	0.05	0.05	0.05
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	2.40	2.40	2.40	2.40	2.40
Levelized Annual Total Cost (\$ Millions/year)	2.40					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	234.94	38.24	46.80	50.95	52.32

Implementation Mechanism

Action by the State Legislature would ban use of generators at new home construction sites. The county or city building permit would require electrical power to be available onsite at the beginning of construction.

Barriers to Implementation

APS and SRP originally committed to providing this service to 15% of new homes constructed each year. If this measure were mandatory, homebuilders would need additional lead-time for providing electrical power before other scheduled construction activities. Utilities would need to have capacity to meet these additional requirements. It is anticipated that some areas will not have the utility infrastructure, delaying building activities. It is assumed that 80% of new homes would be able to replace fuel-fired generators. The main barrier is the ability of utility companies to provide service to new construction areas in a timely manner.

Affected Parties

- Utilities
- Homebuilders
- Contractors
- Maricopa County or Cities (whoever issues permits)

Title: Increase Funding for County Inspection and Dust Control Program
Origin: Brown Cloud Summit; Stationary and Area Source Subcommittee
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Maricopa County

Description

This measure adds five additional full time personnel for the enforcement of fugitive construction dust. Four of this personnel would be for Maricopa County, one for Pinal County.

Background

Construction activity fugitive dust and entrainment from construction equipment trackout are significant contributors to the soil component of visibility impairment. To improve compliance with dust control practices, the regulated industry must understand the requirements and methods to comply. This can be done by increased inspection, education, and enforcement. The outreach and education elements are addressed under the education and training course control measure being recommended by this Subcommittee. This measure will enhance the existing enforcement program for fugitive dust sources through increased inspection frequency and monitoring. Maricopa County's program currently has 8 inspectors, a supervisor, a coordinator, 2 enforcement officers, a county attorney and support staff. These inspectors are responsible for the entire county, with the majority of the 2600 construction sites located inside the PM₁₀ nonattainment area that encompasses approximately 2800 square miles.

Sectors Affected

Construction activity fugitive dust
Entrainment from construction
Windblown construction dust

Effectiveness of Measure

Each 5% improvement in the compliance rate results in an estimated additional reduction of 4.7 metric tons per day of PM₁₀ (1.7 metric tons of PM_{2.5}) or approximately 1500 metric tons per year of PM₁₀ (540 tons of PM_{2.5}) assuming 313 days per year for construction activities. These estimates were derived by increasing the compliance rate by 6.5% and recalculating the 2006 emissions reductions using the methodology on page V-10 of the "Technical Support Document" for the "Revised MAG 1999 Serious Area Particulate Plan for PM₁₀ for the Maricopa County Nonattainment Area."

Cost of Measure

Each additional inspector can make approximately 750 inspections per year averaging simple and complex inspections. The cost per inspector including all direct and indirect costs (vehicles, space, support staff, supervision, etc.) is approximately \$105,000. It is estimated that it would take five (5) additional staff to achieve a 6.5% improvement in compliance. This would equal \$525,000 for 5 new FTE's. The cost effectiveness of the measure is estimated to be \$986 per metric ton of PM_{2.5}.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.48	0.37	0.43	0.48	0.51
Standard Visual Range Improvement (Km)	0.00	0.1	0.1	0.1	0.1	0.1
Haziness Improvement (Deciview)	0.00	0.03	0.03	0.03	0.03	0.03
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	0.53	0.57	0.65	0.75	0.86
Levelized Annual Total Cost (\$ Millions/year)	0.69					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	22.51	27.02	22.06	20.35	19.65

Implementation Mechanism

Maricopa County Environmental Services Department may need to obtain legislative authority to increase it's expenditure budget before the additional staff could be hired.

Barriers to Implementation

Affected industry and the general public may be reluctant to fund additional personnel depending on the proposed funding source. Budgetary constraints on government may limit the additional funding available for the program, depending on annual spending priorities.

Affected Parties

- Maricopa County
- Pinal County
- Construction businesses

Title: Dust Control Training For Contractors; Develop and implement a standardized dust control certification training program for construction activities for compliance with Maricopa County Rule 310

Origin: 2000 Brown Cloud Summit; Stationary and Area Source Subcommittee

Pollutant(s): PM₁₀, PM_{2.5}

Category: Stationary and Area Source

Geographic Area: Maricopa County

Description

This measure would develop and implement a standardized dust control certification training program for construction companies and other stakeholders in Maricopa County to enhance compliance with Maricopa County Rule 310. Participation in the training and certification would be required for a construction company to obtain a county permit. This program utilizes ADOT's interim training class and particulate matter (PM₁₀) manual already developed. A Technical Advisory Group would establish the curriculum. The training program could be implemented through agencies (i.e., ADOT) or a community college.

Background

The Arizona Department of Transportation (ADOT) initiated a partnership with the Maricopa County Environmental Services Division to develop and provide educational tools for ADOT employees and stakeholders. This program addresses on-site construction causes of PM₁₀. Arizona State University joined in the effort and developed a PM₁₀ project manual. A one day workshop was held for ADOT internal and external stakeholders on September 18, 2000. The funding for this project was limited to the development and demonstration of a pilot program.

The ADOT Transportation Planning Air Quality Team developed and presented a proposal for \$150,000 to continue the educational and outreach effort for public and private stakeholders. This effort would include developing and implementing a standardized educational and outreach program that could be utilized not only in Maricopa County, but throughout the State. The proposal and funding were approved by the Federal Highway Administration. The scope of work is currently being developed.

Sectors Affected

Construction activity fugitive dust
Dust entrainment from construction vehicles and equipment
Windblown construction dust

Effectiveness Estimate

There is no analytical method to estimate of the effectiveness of training on the reduction of visibility pollutants. Therefore, the following assumptions were used for input into the visibility assessment tool.

- Acres of land/year affected is estimated from ADOT 1999 activity.
30 major new roadway construction projects = 2,277 acres,
49 resurfacing projects, 25 acres per job (plant sites, yards, etc.) = 1,225 acres,
100 other projects (signals, bridges, landscapes, etc.) 10 acres per job=100 acres
TOTAL = 3,602 acres
Estimate for the Statewide Program = 3,000 to 5,000 acres
- Number of contractors - Based on the current ADOT field report records:
179 prime contracts open
1,279 sub-contracts last year.

The input to the visibility assessment tool assumed that education and dust control certification would reduce particulate matter generation by 5%. This is the same factor being used for increased dust control inspections. Currently, the effectiveness of dust control is measured by the number of violations issued. Increased education should reduce the number of violations in addition to improving visibility. It is sincerely hoped that participants will be motivated to go beyond mere compliance and work toward air pollutant reduction excellence. But for the purposes of input into the visibility improvement tool, very conservative estimates of effectiveness were used. The resulting analysis should, therefore, be considered minimum expectations, with much a higher level of visibility improvement possible.

Cost

The \$150,000 funding for the development of a standardized dust control certification program has already been approved by the Federal Highway Administration through the Arizona Transportation Research Center.

The cost for the class would be a nominal registration fee for each participant. Stakeholders would be responsible for coordinating implementation of the training program within their own organizations. The training program could be integrated into appropriate agencies' current training programs and also be included in the curriculum of a Community College. Maricopa County Environmental Services Department would manage and report on the effectiveness of the training program. The cost per deciview change estimated in the table below is based upon a one time development cost of \$150,000 which is already secured by ADOT.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.08	0.08	0.11	0.15	0.18
Standard Visual Range Improvement (Km)	0.00	0.00	0.00	0.00	0.00	0.00
Haziness Improvement (Deciview)	0.00	0.01	0.01	0.01	0.01	0.01
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	0.15	0.00	0.00	0.00	0.00
Levelized Annual Total Cost (\$ Millions/year)						0.02
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	4.34	4.18	2.79	2.18	1.88

Implementation Mechanism

A Technical Advisory Committee (TAC) would be established to complete the scope of work for the development of the standardized dust control certification program. The TAC would work with a consultant to develop the standardized training program and would also assist in developing the implementation plan. The TAC would include representatives from ADOT, Maricopa County Environmental Services Division, Arizona Department of Environmental Quality, the contractor community, and regional city representatives. The project manager for the development of the education program will be an environmental representative from the Arizona Transportation Research Center.

Implementation Authority

Based on some of the decisions that will be made during the development of the training program and implementation plan, some agency rule(s) or operating procedure revisions may be required.

Period for Implementation

Following the completion of the final scope of work, a consultant will be hired to complete the development of the training program and implementation plan. The standardized training certification program for all public and private stakeholders should be available in late 2001 or early 2002. In the interim, ADOT and Maricopa County will continue with their current training and outreach efforts.

Barriers to Implementation

Participation in the process by all stakeholders is essential to ensure the development and implementation of a value added, standardized, dust control certification training program.

Affected Parties

All stakeholders that bid on construction contracts and are required to obtain a dust control permit would be affected by this control measure. The dust control education program would also be available to all other interested parties.

- Homebuilders
- Contractors
- Arizona Department of Transportation
- Maricopa County
- Local Governments
- Taxpayers

Source: ADOT Sept. 29, 2000

Title: Expansion of Area A
Origin: 1998 Governor's Air Quality Task Force
Pollutant(s): PM₁₀, PM_{2.5}, NO_x, VOC and CO
Category: Stationary and Area Source
Geographic Area: West side of Area A

Description

This measure would expand the western boundary of Area A to include the areas previously excluded in SB1427 (1998).

Background

This measure would add high growth communities in the West Valley, including Buckeye and Surprise, to the definition of Area A, which is currently defined at A.R.S. § 49-541. These communities were included in the proposed expansion in SB 1427 at the beginning of the 1998 legislative process, but were later excluded as the law was finalized. Area A is the boundary for the applicability of several air pollution control programs. For the purposes of the visibility tool assessment, the programs included in the analysis were: fireplace burning restrictions on wintertime pollution alert days, requirements for clean burning fireplaces in new construction, vehicle emission testing and cleaner burning gasoline. For consistency, other Area A programs applicable to the expanded Area A include: stage II vapor recovery, stabilization of roads, alleys, and shoulders, vacuum systems for crack and seal operations, vehicle fleet plans and trip reduction programs, parking prohibitions for municipal employees not participating in the VEI program, traffic light synchronization, alternative fuel vehicle requirements for local governments and school districts, on-road diesel fuel for off-road engines, and retirement of pre-1988 heavy duty diesel engines before 2004.

The expected increase in population in areas adjacent to the western edge of Area A will create sources of emissions that impact Area A. The purpose of this measure is to capture additional potential air quality benefits in the metropolitan area from the application of the air pollution control programs noted above in these areas west of the current program boundaries. Emissions from these areas can potentially be transported into the Maricopa County Nonattainment Area and affect efforts to achieve and maintain attainment of the CO, ozone, and PM₁₀. Vehicles from outside the boundary also are likely to have higher per vehicle emissions because they are not subject to emissions testing and are likely to be operated, at least some of the time, within the nonattainment area.

Sectors Affected

Residential wood burning
Gasoline vehicle exhaust

Effectiveness of Measure

The tables under the "Visibility Assessment Tool Results" section describe the potential visibility

benefits associated with an expansion of Area A to the west. The estimate includes fireplace burning restrictions on wintertime pollution alert days, requirement for clean burning fireplaces in new construction, vehicle emission testing, and cleaner burning gasoline for the potential expanded portion of Area A.

Cost of the Measure

Expanding the boundaries of Area A will subject the individuals and entities in the affected areas to costs associated with new regulatory requirements.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Clean Burning Gasoline/Emission Testing

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.04	0.02	0.02	0.02	0.02
Standard Visual Range Improvement (Km)	0.00	0.007	0.0045	0.0039	0.0031	0.0032
Haziness Improvement (Deciview)	0.00	0.0028	0.0017	0.0014	0.0011	0.0012
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	1.50	1.50	1.50	1.50	1.50
Levelized Annual Total Cost (\$ Millions/year)	1.50					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	531.98	888.68	1087	1331	1260

Wood Burning Control Measures

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.05	0.03	0.03	0.02	0.02
Standard Visual Range Improvement (Km)	0.00	0.00	0.00	0.00	0.00	0.00
Haziness Improvement (Deciview)	0.00	0.0032	0.0021	0.0018	0.0016	0.0016
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	0.40	0.40	0.40	0.40	0.40
Annual Operating and Maint. Cost (\$ millions/year)	-	-	-	-	-	-
Levelized Annual Total Cost (\$ Millions/year)	0.33					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	102.31	155.58	180.11	209.48	203.70

Implementation Mechanism

Necessary legislative changes would be needed to expand the western boundaries of Area A.

Period Required for Implementation

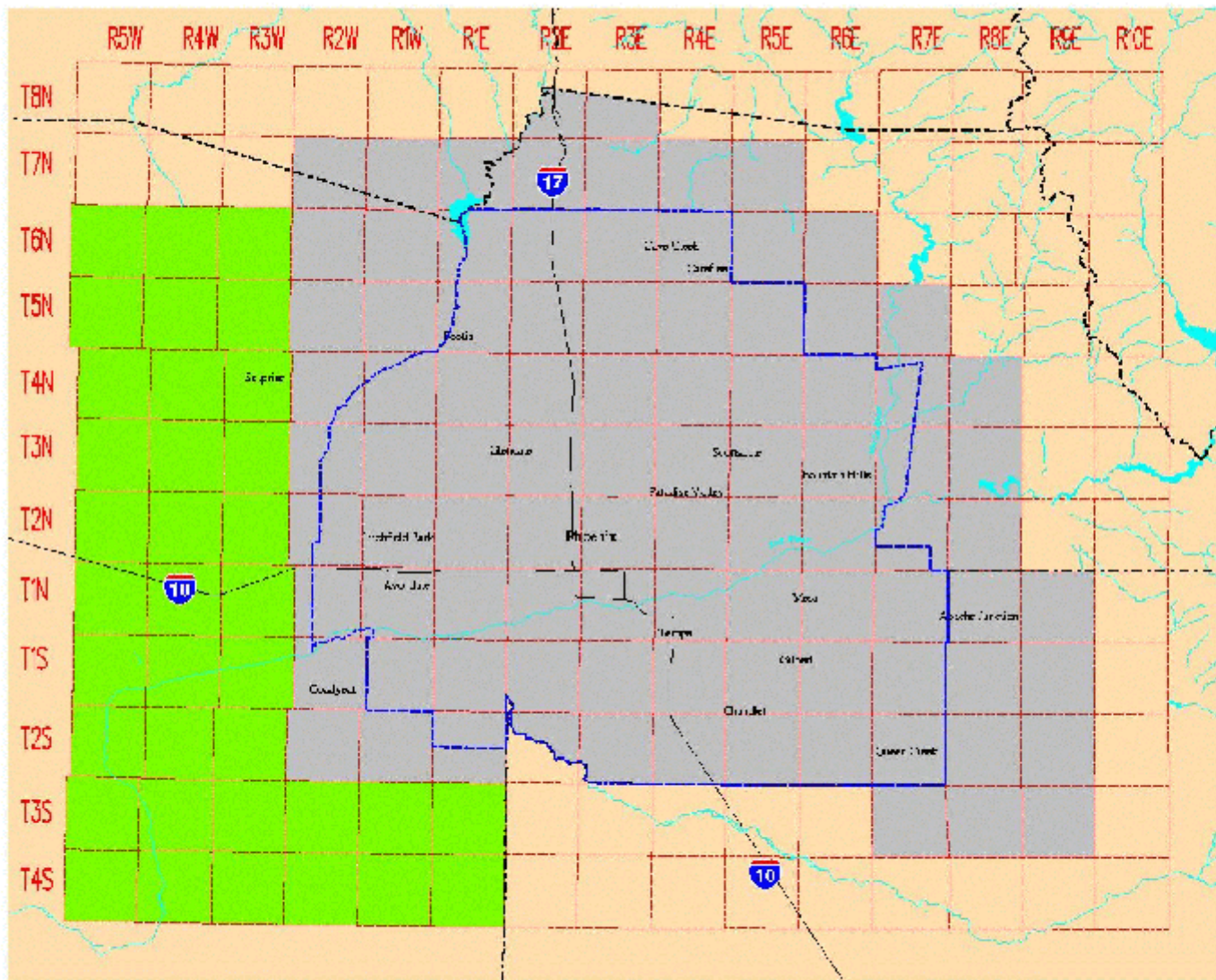
To be determined by the Legislative action.

Barriers to Implementation

Local officials in the areas affected by the expansion may oppose the measure, which is similar to the proposed 1998 expansion of the boundaries of Area A.

Affected Parties

- Individuals and entities in the expanded Area A



-  Area A Boundaries
-  Expanded Area A Boundary
-  Old Area A Boundary
-  U.S. Highway
-  Township and Range Boundaries



Approved for Release by NSA on 05-08-2014 pursuant to E.O. 13526

PHOENIX AREA A AND EXPANDED AREA A BOUNDARIES

DATE: 01/20/2009

BY: [REDACTED]

CLASS: UNCLASSIFIED

CONTROL: UNCLASSIFIED

EXEMPT FROM: [REDACTED]

EXEMPTION CODE: [REDACTED]

PHOENIX AREA A AND EXPANDED AREA A BOUNDARIES

Title: Air Quality Alert Days
Origin: 2000 Brown Cloud Summit; Stationary and Area Source Subcommittee
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Phoenix metropolitan area

Description

This measure includes adding visibility pollutants to the current air quality alert system. The proposed alert criteria for is PM₁₀ >100 Fg/m³ (microgram per cubic meter).

Background

The winter time air quality alert program monitors carbon monoxide and particulate matter (PM₁₀). The summer-time air quality alert system monitors ozone. The air quality alert system works as follows. ADEQ or Maricopa County Environmental Services Department makes a forecast of specific pollutants based on weather and air quality monitoring data. If the forecast predicts a possible exceedance of the identified National Ambient Air Quality Standards (NAAQS) or an established index, then an air quality alert day is called. Employers, the media, and fleet organizations are contacted to implement trip reduction programs and other measures to reduce the generation of air quality pollutants. Recommendations on alert days include carpool/vanpool, ride the bus, refuel vehicles after 4:00 p.m., delay use of gas-powered garden and lawn equipment, and not lighting wood fires. This program would standardize recommended actions for all winter air quality alert days.

In 1999, Maricopa County called six winter-time air quality alert days for exceeding >120 µg/m³ of PM₁₀ particulate. This proposal would reduce the index to >100 µg/m³ PM₁₀ particulate. It is estimated that with this index value there would be approximately twelve PM₁₀ air quality alert days called per winter season.

Sectors Affected

Residential wood burning
Gasoline vehicle exhaust

Effectiveness Estimate

The measure is estimated to reduce 2.3 million vehicle miles traveled per alert day in the Phoenix metropolitan area, which is a 3.5% reduction. Estimates are based upon a 1999 survey aimed at assessing the success of the Ozone Alert Program conducted by West Group Research under contract with the Regional Public Transportation Authority. The 3.5% reduction rate was also used for reduction in residential wood burning for input into the visibility assessment tool.

Cost Assumption

Cost for this measure is based on one full time equivalent personnel for administrative support of the program. Covered in this estimate is manpower for air quality monitor maintenance, data reduction and quality assurance, data transmittal, and coordination with facilities and the media. Operational costs are estimated to increase 3% annually. The cost was split between residential wood burning and gasoline vehicle exhaust when it was run through the visibility improvement tool.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Wood Burning Restrictions

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.01	0.01	0.01	0.01	0.01
Standard Visual Range Improvement (Km)	0.00	0.00	0.00	0.00	0.00	0.00
Haziness Improvement (Deciview)	0.0000	0.0008	0.0008	0.0007	0.0006	0.0005
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	0.05	0.06	0.06	0.07	0.09
Levelized Annual Total Cost (\$ Millions/year)	0.07					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	85.71	84.66	101.87	121.13	147.29

Gasoline Vehicle Exhaust

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.06	0.03	0.02	0.02	0.02
Standard Visual Range Improvement (Km)	0.00	0.00	0.00	0.00	0.00	0.00
Haziness Improvement (Deciview)	0.0000	0.0037	0.0022	0.0018	0.0015	0.0016
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	0.05	0.06	0.06	0.07	0.09
Levelized Annual Total Cost (\$ Millions/year)	0.07					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	18.75	31.77	38.57	46.70	43.95

Implementation Mechanism

This program seeks voluntary participation by the public, private sector, and government agencies in the Phoenix metropolitan area.

Period for Implementation

The program could be implemented for the 2001 winter season.

Barriers to Implementation

The air quality alert program is currently in place. The only change is to reduce the index value for PM₁₀ alerts. There is concern that public response is most effective when there are a reasonable number of alert days called. The West Group Research 2000 survey concluded that awareness of the Clean Air Campaign remains high and the majority of residents believe it is important to encourage changes in their behavior. They cautioned that the focus needs to be on motivating people to take actions and convincing them that their action will make a difference, especially if alerts are called once a week or a more periodic basis.

Affected Parties

- Public
- Employers
- Fleet Operators
- Media
- ADEQ
- Maricopa County Environmental Services Department

Title: Controls for Stationary Reciprocating Internal Combustion Engines
Origin: Brown Cloud Summit, Stationary and Area Source Subcommittee
Category: Stationary and Area Sources
Pollutants: SO₂, PM₁₀, PM_{2.5}, (NO_x, CO)
Geographic Area: Maricopa County

Description

This measure would require stationary reciprocating internal combustion engines (primarily back-up generators) to use low sulfur fuels.

Background

At the present time, Maricopa County does not have a stand alone rule for stationary internal combustion engines. There is a reference to internal combustion equipment in Rule 200, Section 303, that states a source is exempt from a non-Title V permit if the engines have a manufacturer's maximum continuous rating of 50 horsepower or less or a maximum accumulative rating of 250 horsepower or less for engines used in the same process at the same source or used for emergency purposes. Rule 241 (Permits for New Sources and Modifications to Existing Sources) requires Best Available Control Technology (BACT) at 25 tons per year (150 pounds per day) of NO_x, 25 tons per year (150 pounds per day) of PM, and 15 tons per year (85 pounds per day) of PM₁₀.

The Subcommittee requested Maricopa County Environmental Services Department to review EPA stationary source NO_x requirements and NO_x control measures from other states and compare them to Maricopa County rules.

- Maricopa County reviewed the 1993 EPA document entitled "Alternative Control Document-NO_x Emissions from Stationary Reciprocating Internal Combustion Engines," EPA's 1999 technical bulletin entitled "Nitrogen Oxides (NO_x) and How They Are Controlled," and an EPA 1995 memorandum entitled "De Minimis Values for NO_x RACT." EPA expects that NO_x Reasonable Available Control Technologies (RACT) for internal combustion engines will be set at 1.0 to 2.0 grams per horsepower per hour (g/hp-hr) for gas fueled rich-burn (using less than one percent oxygen) engines, and up to 8.0 g/hp-hr for oil/diesel fueled lean-burn (using more than 1 % oxygen) engines. These limits can be achieved by various combustion techniques such as ignition retardation or adjusting the air to fuel ratio. Even lower NO_x limits can be achieved by using add-on controls such as selective non-catalytic reduction (SNCR). States may require control technologies that reduce emissions beyond RACT or Title V requirements if the state is in a nonattainment status and if modeling found that such controls were necessary for expeditious attainment of the ozone national ambient air quality standard. However, ozone nonattainment areas that were granted a NO_x RACT waiver are not precluded from developing rules to limit NO_x.
- Maricopa County also reviewed nine different RACT rules around the country , concentrating

on California jurisdictions because they have the most stringent rules in the country. In addition, the Los Angeles area is designated as “severe nonattainment” for ozone. The RACT rules around the country vary in the size of units regulated by the rules. California’s South Coast Air Management District has Rule 1110.2 regulating both rich and lean burn internal combustion engines. This rule limits the NO_x emissions in engines over 50 horsepower to 36-45 parts per million by volume (ppmv) (less than 1.0 gm/hp-hr) regardless of the type of fuel used. The rule exempts standby engines that operate less than 200 hours per year. New Jersey’s rule contained in Title 7/Chapter 27/Subchapter 19, does not regulate internal combustion engines below 500 hp, then imposes limitations on 1.5 gm/hp-hr for rich-burn engines using gaseous fuel and up to 8.0 gm/hp-hr for lean-burn engines using liquid fuel. Most presumptive NO_x RACT rules also have limits for carbon monoxide (CO) so that the CO emissions do not increase out of proportion to NO_x emissions because decreasing NO_x can lead to increased CO and vice-versa.

Based upon this information, the Subcommittee discussed how Maricopa County could develop new rules to address NO_x emissions from stationary reciprocating internal combustion engines.

- The minimum technology required to meet the NO_x limitations would be low NO_x combustion techniques, which are pollution prevention measures. The rule could also provide flexibility by allowing facilities the option of obtaining emission reduction credits for NO_x in lieu of installing controls.

The Subcommittee requested Maricopa County Environmental Services Department to review stationary source internal combustion engines PM control measures from other states and compare them to Maricopa County rules.

- Maricopa County reviewed the 1996 State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) document entitled “Controlling Particulate Matter Under the Clean Air Act: A Menu of Options” for internal combustion engines and also reviewed nine different RACT rules around the county. The RACT rules vary with the size of the units controlled. The majority do not address PM emissions. New York has a rule, “Stationary Combustion Installations,” Part 227-1-2, that limits PM emissions from 50 million (British Thermal Unit) BTU per hour units using oil (other than distillate) or other liquid fuel to 0.20 pounds per million BTU heat input. The Federal New Source Performance Standards (NSPS), Part 60, does not address stationary internal combustion engines. The STAPPA/ALAPCO document recommends adoption of reformulated diesel fuel to achieve particulate matter reductions from diesel engines.

Based upon this information, the Subcommittee discussed how Maricopa County could develop new rules to address PM emissions from stationary reciprocating internal combustion engines.

- Maricopa County could develop a new rule to address particulate emissions by extending the state requirement (A.R.S. 41-2083) for low sulfur motor engines fuel to stationary internal

- combustion engines.
- During a discussion of fuels used for emergency back-up generators at hospitals, and other large institutions, it was noted that two different fuel types are required as a contingency. Therefore, any proposed control measure could not be so exclusive as to limit fuel to only one type.

For the visibility assessment tool, the Subcommittee requested that the measure focus be on particulate reductions and limiting fuels to low sulfur (<500 ppm).

Sectors affected

Non-utility stationary sources

Effectiveness of Measure

Control effectiveness estimates were obtained from the 1996 STAPPA/ALAPCO document “Controlling Particulate Matter Under the Clean Air Act: A Menu of Options,” page 104. Low sulfur content in fuel decreases SO₂ emissions which contribute to secondary atmospheric PM formation, and also decreases the PM emissions by reducing the amount of sulfate produced during combustion. EPA estimates PM reductions of 20-40% by limiting the sulfur content in diesel fuel to 0.05% by weight (U.S. Department of Energy, Energy Information Administration, September 1994, “Fuel Oil and Kerosene Sales, 1993”).

Cost of Measure

Based on STAPPA/ALAPCO, “Controlling Particulate Matter Under the Clean Air Act: A Menu of Options” publication, page 107, the cost of lowering sulfur levels in fuel to 0.05% by weight would be 2.3 cents per gallon. The potential cost savings from fuel economy and reduced maintenance was not considered. The gallons of fuel used for stationary internal combustion engines was obtained from the Maricopa County Emissions Inventory 1995 database. The estimate used for the visibility assessment tools was 650,000 gallons, at a 2.3 cent increase per gallon, or \$14,950 per year.

Visibility Assessment Tool Results (Worst 20% Average Winter Day)

Visibility Changes - Baseline vs. Control Option	1995	2003	2006	2010	2015	2020
Light Extinction Improvement (1/Mm)	0.00	0.02	0.02	0.02	0.03	0.03
Standard Visual Range Improvement (Km)	0.00	0.003	0.004	0.005	0.005	0.005
Haziness Improvement (Deciview)	0.00	0.001	0.002	0.002	0.002	0.002
Control Costs and Cost/Benefit						
Capital Cost (\$ millions)	-	-	-	-	-	-
Annual Operating and Maint. Cost (\$ millions/year)	-	0.02	0.02	0.02	0.02	0.02
Levelized Annual Total Cost (\$ Millions/year)	0.02					
Cost Benefit (Levelized Annual Cost per Deciview Change (\$ millions/deciview)	n/a	11.19	9.75	8.55	7.89	7.61

Implementation Mechanism

This recommendation would be implemented by Maricopa County through a new rule developed for the Board of Supervisors consideration.

Period Required for Implementation

The County could create a new rule for internal combustion engines that could be completed by 2001. The compliance schedule in the rule would give the existing facilities until 2003 to meet the rule requirements.

Barriers to Implementation

Lack of consensus on various provisions of the rule is the main barrier to implementation.

Affected Parties

- Operators of stationary internal combustion engines (of a size yet to be determined). Examples of facilities that need large backup generator units include: large computer centers, telephone switching centers, medical facilities, office buildings, nursing homes, manufacturing facilities and rock product facilities.
- Maricopa County Environmental Services Department

Group 2 Control Measures

Control Measures Considered but Not Recommended by the Subcommittee

Title: Require Natural Gas for Electricity Generation
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutants: PM₁₀, PM_{2.5}, NO_x
Category: Stationary and Area Source
Geographic area: Maricopa County

Description and Background

Existing power plants in Maricopa County periodically use fuel oil when generating electricity. Burning fuel oil produces considerable more PM_{2.5} than burning natural gas, the other fuel of choice. Thus, discontinuing use of fuel oil would improve visibility throughout the area. Burning natural gas exclusively would also make NO_x controls more viable for facilities.

Hospitals and other large institutions with emergency generators need to have two available sources of fuel for contingency purposes. A total ban on the use of fuels other than natural gas, therefore, may be too restrictive. This measure reflects potential restriction to fuels other than natural gas, specifically for:

- Emergency use only
- Burn only fuels with low sulfur content

Sectors Affected

Utility stationary sources
Non-utility stationary sources

Effectiveness Estimate

Maricopa County Environmental Services Department estimated that this measure could reduce NO_x by 9 tons out of 250 tons, and reduce PM₁₀ by 1 ton out of 40 tons.

- Power plants:
Natural gas used 12,546 MMCF
Diesel used 941,277 gallons
(of which at least 322,087 gallons was ≤500 ppm sulfur)
- Institutional/emergency generators:
Natural gas used 5,493.6 MMCF
Diesel used 163,027 gallons
(no data on sulfur content available)

Cost of measure

Information for Steve Smith, of TOSCO, indicated there is \$0.25 difference per gallon, based on

California pricing, which was assumed to be similar to Arizona.

Implementation Mechanism

These recommendations would be implemented by Maricopa County through new rules developed for consideration by the Board of Supervisors.

Period Required for Implementation

The County is currently modifying the existing rule for electric power generation to address sulfur dioxide (SO_x) and particulate matter (PM₁₀). If fuel use restrictions were included with these additional limits, the rule development process could be completed in 2001. The compliance schedule in the revised rule would give existing facilities until 2004 to meet the new requirements.

Barriers to Implementation

Potential lack of a consensus on various provisions of the rule is the main barrier to implementation.

Affected Parties

- Electric utility plants
- Large facilities that need back-up generators
- Maricopa County Environmental Service Department

Title: Emissions Cap and Trading Program
Origin: Grand Canyon Visibility Transport Commission, Report of the Governor' Air Quality Strategies Task Force, Feb. 1998, Texas Natural Resource Conservation Commission
Pollutant(s): PM_{2.5}, Elemental And Organic Carbon, NO_x, Ozone, CO
Category: Stationary and Area Source
Geographic Area: Area A

Background and Description

Emissions cap and trade programs can be designed to include various sources and pollutants. Several types of trading programs exist. A description of the most common programs is provided below.

Cap and Trade - an emissions trading program that limits the total emissions from the sources participating in the program. The program also allows participating sources flexibility in complying with their emission limits through the trading of allowances among sources included within the scope of the cap. The Western Regional Air Partnership (WRAP) has proposed such a trading program for SO₂ sources in the WRAP region.

Multi-Source Emission Cap and Trade - an emissions trading economic incentive program that limits the total emissions from a certain category or group of sources to a level needed for an area to attain or maintain a National Ambient Air Quality Standard (NAAQS), and allows sources flexibility in complying with their emission limits. (Can be referred to as inter-source-trading within the capped source group.)

Open-Market Trading Program (OMT) - an emissions trading program that gives sources flexibility in complying with a variety of rate-based emission limits required in a state implementation plan (SIP). An OMT program includes two distinguishing components: 1) emission reductions are generated during a discrete period of time and quantified in units of mass and 2) emission reductions are used some time after they are generated (i.e., use and generation do not occur contemporaneously).

Command and Market - a program that sets emission reductions beyond those required by state or federal law and then allows the related credits to be banked and traded among sources to achieve cost effective compliance, or provide offsets for new source growth.

Description

There are several types of emissions banking programs; however, for all, quantifiable emission reductions are achieved through a discount of available emission credits. An example of an off-road emissions banking program would be retrofitting construction equipment to meet cleaner engine standards, then banking the emissions saved for future use or to sell to another company.

During its September 25, 2000, meeting the Off-Road Subcommittee agreed to the following

parameters of an emissions bank program for purposes of the ITAG visibility assessment tool.

- A 10% emission credit discount would occur at the time the credits are purchased, not banked, i.e., the buyer would pay for 110% of the needed credits, but 10% would be retired at the time of the transaction.
- All off-road source categories would be eligible to participate in the program through the early purchase (before end of useful life) of “clean engine” equipment or retrofitting existing engines. Emissions credit would be prorated according to the remaining useful life of the original equipment and emissions reduced from the changeover.
- Inter-pollutant trading would be permitted, but this requires considerable additional analysis.
- The program would begin in 2003.
- The geographical area (e.g., Maricopa county, Area A, etc.) for the program is undecided at this time.

Issues

Maricopa County has done extensive work with EPA to try to determine how mobile emission reduction credits (MERCs) could be utilized by stationary sources to obtain offsets for New Source Review permits. Because many of the issues related to the operations of an emissions bank are directly applicable to generating approvable offsets, information on Maricopa County’s work is being provided here. In general both offsets used in permitting and emission credits available for trading must be permanent, quantifiable, enforceable, and a true surplus reduction, above and beyond any other applicable requirement or provision relied upon in any SIP. Offsets or emission credits must be generated and used in the same nonattainment area/airshed.

Because MERCs are time-bound, related to the remaining useful life of the equipment being upgraded or replaced, the life of any reduction must be determined.

Quantifying emissions reductions is also critical. Considerable recordkeeping is necessary including:

- Historic use, such as vehicle miles traveled, hours of operation, and fuel consumption,
- Historic use locations, and
- Future use patterns to account for actual use and location, must also be documented, including whether use remains the same or demand is shifted elsewhere in response to the increased cost of the retrofit or change-out (i.e. effects of the elasticity of demand).

Several air quality management districts in California have adopted rules governing MERCs for inclusion in their SIPs. EPA has yet to approve any of those submittals as the organizations are still negotiating some issues.

Title: Government Funding for Water/Pre-Watering Activities
Origin: 1998 Governor's Air Quality Task Force
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description

This measure would provide grants or other compensation to control dust at construction sites with water. Pre-wetting is an activity that contractors perform prior to excavation. It makes the dirt softer and easier to excavate and also suppresses dust by adding more moisture content to the soil. ADOT and other government agencies commonly pay for dust suppression on their construction projects. However, ADOT and other government agencies do not currently recognize pre-wetting as a dust suppression activity, and therefore, do not pay for this practice on an as-needed basis. This measure would mandate that ADOT and other governmental agencies pay for pre-wetting and other water on an as needed basis to control dust at project sites.

Background

The Association of General Contractors (AGC) recommended to the 1998 Task Force a statutory change be made to address water used for dust suppression. The Task Force did not include the measure in its final recommendations.

Sectors Effected

Unpaved road dust
Fugitive dust

Effectiveness of Measure

Since dust suppression activities on construction sites are required as Reasonable Available Control Measures by Rule 310, implementation of these measures would reinforce the control efficiency and compliance rates for Rule 310. This measure would increase the effectiveness of Rule 310 because there would be less opportunity for fugitive dust emissions.

Cost of the Measure

The cost of water will vary depending upon the size of the construction project.

Implementation Mechanism

The Arizona Legislature could pass a law requiring ADOT and other government agencies to pay for

water needed in dust suppression activities on their construction sites.

Period Required for Implementation

This measure could be addressed in the 2001 Legislative session.

Barriers to Implementation

Government funds to pay for the additional water may reduce resources available for other priority projects and services.

Affected Parties

- Homebuilders
- Contractors
- ADOT
- Maricopa County
- Local Governments
- Taxpayers
- Arizona Legislature

Title: Reduce BACT Trigger for New and Modified Sources to 10 lb./day
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutants: NO_x
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

Maricopa County currently has Rule 241 that requires best available control technology (BACT) to limit NO_x to 25 tons per year (150 pounds per day) on new and modified sources. California local air management districts have rules similar to this suggested measure that require BACT to limit NO_x to 10 pounds per day. Currently engines of 250 horsepower (HP) and over exceed the current rule, but under the proposed 10 pounds per day limit engines at 100 HP and above would have to demonstrate low NO_x technology. Natural gas fired boilers at 40 million (British Thermal Units) BTUs and above must comply with Rule 241, but that size would drop to 15 million BTUs or larger under the proposed 10 pound per day trigger.

Effectiveness Estimate

No effectiveness estimates have been determined. Efficiency estimations could be done through a study or survey once the recommendations were implemented.

Cost of the Measure

The cost of the measure was not estimated.

Implementation Mechanism

This recommendation would be implemented by Maricopa County through new rules developed for the Board of Supervisors.

Period Required for Implementation

The rule development process could be completed in 2001. The compliance schedule would give existing facilities until 2003 to come into compliance. New sources would need to comply with the rule as of January 1, 2003.

Barriers to Implementation

Potential lack of stakeholder consensus in developing rule revisions would be the main barrier to implementation.

Affected Parties

- Maricopa County
- Facilities with boilers, engines that emit 10-150 lbs./day NO_x

Title: Require Road Shoulder Stabilization
Origin: 1998 Governor’s Air Quality Task Force
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

Stabilization of unpaved shoulders reduces the silt which is transferred to the adjacent paved street surface. This reduces the re-entrainment of dust by vehicles traveling on the street, which in turn, lowers ambient PM₁₀ and PM_{2.5} concentrations. Many cities in Maricopa County already stabilizing unpaved road shoulders.

This measure involves a coordinated effort to develop and implement a plan for stabilizing unpaved shoulders on targeted arterials in the non-attainment area. The plan would address expected performance goals, criteria for targeting arterials, a schedule for implementation, funding options and reporting requirements.

In implementing the plan, participants would be given discretion to choose appropriate treatment materials, including chemicals, slurry seal, or other petroleum-based products which is not prohibited for ground surface application by ADEQ, ADWR, or EPA as treatment for controlling dust. Criteria for targeting arterials would include characteristics such as daily traffic volume and the number of trucks entering and leaving a facility. The plan would identify an annual stabilization performance goal. Each year participants would report the number of miles stabilized, the frequency of application and the type of treatment.

Effectiveness Estimate

The impacts of this measure on PM₁₀ and PM_{2.5} concentrations will vary depending upon the number of miles of unpaved shoulders which are stabilized and the type of treatment. This would be reported annually by participants. The table below identifies typical costs and control efficiencies for a sample of palliative products that might be applied to unpaved shoulders.

Dust Suppressants Material, Cost and Effectiveness Estimates*			
Suppressant Product	Composition	Unpaved Shoulder \$/Mile^{a,b}	Control Efficiency for PM₁₀
“Dustguard”	Salt:MgCl	3,238 ^c	92%
“Enduraseal”	Tree Resin Emulsion	17,365	>90%
“Road Oyl”	Tree Resin Emulsion	11,616	>90%

“DSS-40”	Acrylic Copolymer	5,163	92%
“Soil Sement”	Polymer Emulsion ^d	4,459 ^c	85-96%
“Coherex PM”	Petroleum Emulsion	5,984	49-99%
“EMC Squared”	Biocatalyst Stabilizer	9,269	0-33%
“Hydroshield”	Sodium Enodspem Hydrate	1,056 ^c	92%
<p>* “Effectiveness Demonstration of Fugitive Dust Control Methods for Public Unpaved Roads and Unpaved Shoulders on Paved Roads.” Desert Research Institute, December 31, 1996.</p> <p>^a Based on application to both shoulders on a paved road (each shoulder is 10 feet wide).</p> <p>^b Includes both the material and application cost.</p> <p>^c Application cost was not available, material cost only</p> <p>^d Topical application</p>			

Cost of Measure

The total resources (dollars, manpower, equipment) required to stabilize shoulders on targeted arterials will vary by agency, depending upon the miles of shoulder, frequency of application, and type of treatment. Individual local governments would fund the actual implementation of the measure in their respective jurisdictions. In addition, MAG, would explore federal, state, and local funding sources to assist in the implementation.

Implementation Mechanism

Local governments, Maricopa County and ADOT would participate in developing and implementing the unpaved road shoulders stabilization plan. The Maricopa Association of Governments could coordinate this effort.

Period Required for Implementation

The plan could be developed in 2001, with the target implementation date of January 1, 2002.

Barriers to Implementation

Competing priorities for limited resources represent barriers to implementation at the State, County, and municipal levels.

Affected Parties

- ADOT
- Maricopa County
- Local Governments
- Maricopa Association of Governments

Title: Control for Boilers and Gas Turbines-Industrial, Commercial, Institutional Units and Electric Utilities
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutant(s): NO_x and CO
Category: Stationary, Point, and Area Source
Geographic Area: Area A

Description and Background

At the present time, Maricopa County does not have a stand alone rule for boilers. The only reference to boilers is in Rule 200, subsection 303.3 that refers to external combustion. This section states a source is exempt from a non-Title V permit if it has an aggregated capacity of less than 2,000,000 British Thermal Units (BTU) per hour calculated by adding only those pieces of equipment over 300,000 BTU per hour with respect to fuel burning equipment fired with natural gas or liquified petroleum gas. Section 308 of Rule 320, Odors and Gaseous Contaminants, limits nitrogen oxides (NO_x) from very large units using liquid or gaseous fossil fuel, such as those in power plants and those which commenced construction or minor modification after May 30, 1972. Rule 241 requires Best Available Control Technology (BACT) for sources that emit 25 tons per year NO_x (150 pounds per day). California rules similar to Rule 241 require BACT at 10 pounds per day of NO_x.

Maricopa County reviewed the EPA document entitled, "Alternative Control Techniques Document-NO_x Emissions from Industrial/Commercial/ Institutional (ICI) Boilers, EPA- 453/R-94-022" and also the memorandum of March 1994 entitled "Cost Effective Nitrogen Oxides (NO_x) Reasonably Available Control Technology (RACT)" for guidance on determining NO_x RACT as it relates to boilers. EPA expects that NO_x RACT will be set at levels that are "comparable" to the levels specified for tangential and dry bottom wall-fired utility boilers. These levels are 0.20 lbs. per million BTU on a rolling 30-day average for tangential fired boilers and 0.30 lbs. per million BTU for wall-fired units using either gas or oil. EPA also recommends a presumptive RACT limit of 25-42 part per million by volume (ppmv) for stationary gas turbines which can be achieved through various combustion techniques such as water or steam injection. States may require control technologies that reduce emissions beyond RACT or Title V requirements if an area is in a non-attainment status and if modeling found that such controls were necessary for expeditious attainment of the ozone national ambient air quality standard. However, ozone nonattainment areas that were granted a NO_x RACT waiver are not precluded from developing rules to limit NO_x.

Maricopa County also reviewed nine different RACT rules around the country, concentrating on California jurisdictions because they have the most stringent rules in the country. In addition, the Los Angeles area is designated as "severe nonattainment" for ozone. The RACT rules around the country vary in the size of units applicable to the rules. The state of New York has one of the most strict RACT rules in the country, Rule 6NYCRR Part 227, which applies to units 50 Million (MM) BTU/hr with compliance limits for NO_x starting at 0.10 lb/MM BTU. for gas fired units and 0.13lbs./MM BTU for oil fired units. (This rule does not differentiate between the utility boilers and the institutional boilers.)

North Carolina's rule 2D-1400, has no size limitations for which the rule applies and also adopts the EPA NO_x RACT limits of 0.20lbs./ MM BTU and 0.30 lbs./ MM BTU. for tangential and wall- fired units. California's South Coast Air Management District and Bay Area Air Management District have rules addressing commercial units that are more stringent than EPA RACT recommendations, with limitations on gas fired unit rated to 0.036 lbs./ MM BTU and oil fired units rated to 0.048 lbs./MM BTU. Most presumptive NO_x RACT rules also limit carbon monoxide (CO) so that CO emissions do not increase out of proportion to NO_x emissions because decreasing NO_x can lead to increased CO and vice-versa.

Based upon this information, Maricopa County could develop a new rule to address industrial/commercial/institutional units and gas turbines units and modify the existing standards for electric utility steam generators. The minimum technology required to meet the NO_x limitations would be low NO_x combustion techniques, which are pollution prevention measures. The rules could also provide flexibility by allowing facilities the option of obtaining emission reduction credits for NO_x in lieu of installing controls.

Effectiveness of Measure

A comparison of uncontrolled NO_x emission levels (from the EPA/ NESCAUM report) with EPA's presumptive RACT levels indicates that the utility boilers are expected to achieve emission reductions of 30 to 50 %.

Cost of Measure

Based upon the 1992 EPA/NESCAUM report on utility boilers entitled "Northeast States for Coordinated Air Use Management," setting the limits for boilers at presumptive RACT limits will require sources to modify combustion techniques at a cost of \$160 to \$5,100 per ton of NO_x reduced while post combustion techniques (if required) show a cost range of \$320 to \$5,200 per ton excluding selective catalytic reduction. An electric utility plant in Maricopa County is installing Selective Catalytic Reduction (SCR) on one combined cycle unit. The operator stated capital cost (amortized over a 10 year period) and operations and maintenance costs for SCR is \$1,975,242 per year. The addition of this post-combustion control will reduce NO_x from this one unit by 538 tons per year. The cost effectiveness is \$3,671 per ton.

For turbine models above 40 megawatts (MW), setting the limits for gas turbines at presumptive RACT will require sources to modify combustion techniques at a cost of \$55 to \$138 per ton of NO_x removed. Further addition of post combustion techniques to a stationary gas turbine to reduce NO_x even further to 9 ppmv will increase the cost effectiveness from \$3,500 to \$10,500 per ton of NO_x removed.

Implementation Mechanism

These recommendations would be implemented by Maricopa County through new rules developed for

the Board of Supervisors consideration.

Period Required for Implementation

The County is currently modifying the existing rule for electric power generation to address sulfur dioxide (SO_x) and PM₁₀. If NO_x limits are included with the other pollutant limits, the rule development process could be completed in 2001. The compliance schedule in the rule would give the existing facilities until 2004 to come into compliance.

Barriers to Implementation

Lack of consensus agreement on various provisions of the rules is the main barrier to implementation.

Affected Parties

- Electric utility plants, combustion sources of gas turbines and boilers
- Maricopa County

Source: MCESD Sept. 26, 2000

Title: Just-in-time Clearing for Construction Projects
Origin: 1998 Governor's Air Quality Task Force
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

This measure would require developers to minimize clearing and grading and perform these activities just prior to construction. Vacant disturbed land is a significant source of PM₁₀ emissions. This measure would reduce the number of acres of vacant disturbed land, which is exposed during windblown events and other disturbances.

Effectiveness Estimate

This measure would strengthen the control efficiency and compliance levels for Rule 310.

Cost of the Measure

No cost estimate available.

Implementation Mechanism

The just-in-time clearing and grading measure could be implemented as a provision of Maricopa County's Rule 310. The policy could be stated in terms of maximum number of acres to be exposed for a maximum period of time. Just-in-time grading requirements would be integrated into the dust control plans currently required by Maricopa County. Maricopa County would be responsible for enforcement of this measure.

Period Required for Implementation

Necessary revisions to Rule 310 would take approximately one year to complete. Then the measure would be submitted to the Board of Supervisors for consideration.

Barriers to Implementation

The measure would impose a need for additional County enforcement staff and an increased budget.

Affected Parties

- Contractors
- Builders
- Maricopa County

Title: Restrictions on Commercial Fireplaces and Restrictions on Residential and Commercial Fire Pits
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutants: PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic area: Area A

Description and Background

This measure would extend wintertime burning restrictions to commercial fireplaces and commercial and residential firepits.

Title: Ban Used Oil Burning
Origin: Governor's Air Quality Task Force 1998; PM₁₀ Subcommittee
Pollutant(s): CO, VOC's, PM₁₀, NO_x
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

This measure would ban the use of used oil for burning in Area A unless specifically given an exemption by Maricopa County.

Title: Alternatives to Land Clearing by Burning
Origin: Stationary and Area Source Subcommittee
Pollutants: PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic area: Area A

Description and Background

This measure would propose alternatives to land clearing by burning in Area A.

Title: **Operational Control on Leaf Blowers**
Origin: Variant of Recommendation of 1998 Governor's Air Quality Task Force
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

The objective of this measure is to prohibit the use of leaf blowers to blow dust onto streets or roadways. When the 1998 Task Force held public hearings on the proposed measure to ban the use of leaf blowers, many members of the landscape maintenance companies testified that the use of leaf blowers was essential for cost effective maintenance of desert landscaping. This option was recommended by a citizen testifying at one of the Task Force hearings.

Title: **Dust Palliative Tax Incentive**
Origin: Report of the Governor's Air Quality Strategies Task Force, Feb. 1998
Category: Stationary and Area Source
Pollutant(s): PM₁₀
Geographic Area: Area A

Description and Background:

While contractors would like to use dust palliatives on construction sites, the cost of the palliatives are currently too high. Offering a tax incentive would be one way of encouraging developers to use palliatives, rather than water, to control construction-related dust. The Arizona Legislature would pass a law providing tax incentives to encourage use of palliatives. Potential barriers to implementation include tax revenues to pay for the incentives competing with other State projects, programs and services.

Since dust suppression activities on construction sites are required as Reasonably Available Control Measures by Rule 310, implementation of the tax incentive would reinforce the existing control efficiency and compliance rates.

Costs of the tax incentives for developers would be borne by state taxpayers. No cost estimate is currently available.

Title: Transfer State Authority for Portable Source to the Counties
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutants: PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic area: Statewide

Description and Background

This measure would move jurisdiction from the state to counties for portable sources which move from county to county.

Title: Additional Emission Reductions from Consumer Products
Origin: Report of the Governor's Air Quality Strategies Task Force, Feb. 1998
Category: Stationary and Area Source
Pollutant(s): VOCs
Geographic Area: Area A

Description and Background

Consumer products represent approximately 5.6 percent of the Maricopa County Ozone Nonattainment Area emission inventory for VOCs. Currently, Maricopa County Rule 344, Automotive Windshield Wiper Fluid, addresses only 5-6% of the consumer products emissions. The California Air Resources Board (CARB) has developed a more comprehensive set of consumer product regulations, including the Antiperspirant and Deodorant Regulation, Phase I & II Consumer Products Regulation, Alternative Control Plan Regulation, and its Aerosol Coating Regulation. CARB estimates that these regulations will reduce emissions from consumer products by 30 percent. The Task Force recommended adoption of California consumer products regulations.

State law would need to be amended to provide ADEQ the authority to implement rules paralleling the applicable CARB measures. One year to 18 months would be required once the program was authorized in the state statute to complete the rule making process. Approximately one year after rule adoption, products would be required to meet limits established in the rules.

Implementation of the CARB consumer products program is estimated to reduce VOC emissions an additional 5 percent or 1 ton per day of VOC emissions. Sierra Research (1993) estimated the cost effectiveness to be \$1,598 per ton. This cost includes 1.5 full time equivalent (FTE) for administration, enforcement and laboratory for a cost of \$100,000 per year.

Title: Incentivize/Require the Conversion of Wood Burning Fireplaces/Stoves
Origin: Brown Cloud Summit Stationary and Area Source Committee
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

Presently, new home constructed in Maricopa County are required to have natural gas or EPA-approved wood burning fireplaces and wood stoves. This measure would address existing fireplaces and wood stoves. Installation of cleaner burning devices may either be required, or may be accomplished in a more limited fashion by providing economic incentives. This would reduce PM_{2.5} in addressing visibility, and provide a secondary benefit by reducing CO.

Title: Architectural coating rule – STAPPA
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutants: VOC
Category: Stationary and Area Source
Geographic area: Area A

Description

This measure would adopt the recommendations of the September 16, 2000, STAPPA/ALAPCO Model Paint Rule that includes provisions to reduce volatile organic compounds from paint products.

Title: CARB-like Standards for Consumer and Architectural Coatings
Origin: 1998 Governor's Air Quality Task Force
Pollutant(s): VOC
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

Maricopa County Rule 335 was adopted in 1988. Since then, the South Coast Air Quality Management District (SCAQMD) has adopted more stringent standards for this source category, most recently, in 1999, to limit the VOC content of coatings or allow averaging so actual emissions do not exceed allowable emissions. The SCAQMD rule (# 1113) includes a phase-in period with the most stringent standards in place by 2007.

Title: Energy Efficiency for Buildings
Origin: Texas Natural Resource Conservation Commission, South Coast Air Quality Management District
Category: Brown Cloud Summit Stationary and Area Source
Pollutant(s): NO_x, PM_{2.5}
Geographic Area: Area A

Description and Background

This measure was originally proposed by the Texas Natural Resource Conservation Commission and South Coast Air Quality Management District as an ozone reduction measure. Texas suggested implementing energy conservation efforts for buildings, including the 2000 International Energy Conservation Code criteria, to reduce electricity usage through use of better insulation, reflective roofing, etc. Municipalities would be required to enact ordinances to implement this strategy. This control strategy was estimated to provide a reduction of 2.00 tons per day NO_x in the Houston-Galveston area.

Title: Residential & Commercial Air Conditioning Units to Reduce Ozone
Origin: Texas Natural Resource Conservation Commission
Pollutant(s): Ozone
Category: Stationary and Area Source
Geographic Area: Area A

Description and Background

This proposed Texas measure is to reduce ambient levels of ozone directly rather than through the reduction of ozone precursor chemicals. It includes performance standards for covered air conditioning units that may be supplied or installed after January 1, 2002. These requirements are for the ozone reduction technology to have an initial ozone reduction efficiency equal to or greater than 70%, and to retain an ozone reduction efficiency equal to or greater than 50% averaged over any one-hour period, for a period of 15 years. The requirements further mandates labeling of the covered air conditioning units and prohibiting persons from tampering with, or knowingly disabling, ozone reduction technology on covered air conditioning units.

The measure requires persons supplying or manufacturing ozone reduction technology to certify in a registration letter that each make and model of covered air conditioning unit will be compliant with the performance standards. It establishes the testing requirements for determining the ozone reduction efficiency for covered air conditioning units.

TNRCC did not anticipate significant fiscal implications for any unit of state and local government as a result of administration or enforcement of proposed new rule sections. The Commission does anticipate that it will cost manufacturers more to design and manufacture air conditioning units incorporating the ozone reduction technology. Based on estimates provided by air conditioning manufacturers and a potential ozone reduction technology manufacturer and supplier, affected air conditioning units are projected to cost between \$42 and \$116 more per ton of air conditioning capacity. Covered air conditioning units range in size; 1.0 tons and less for window units; 1.5 to 5.0 tons for residential and small commercial units, and 10 to 50 tons for large air-cooled commercial units, such as rooftop units. The resulting price increase would be \$42 to \$116 for typical 1.0 ton window unit, \$63 to \$580 for typical residential unit, and \$420 to \$5,800 for large commercial units.

Title: Retrofit if Not Operating New Technology
Origin: Brown Cloud Summit Stationary and Area Source Subcommittee
Pollutants: NO_x
Category: Stationary and Area Source
Geographic area: Area A

Description

This measure would require retrofits to control NO_x emissions from those sources not operating with low NO_x technology.

Title: Reduction of Existing Opacity Standard
Origin: Stationary and Area Source Subcommittee
Pollutant(s): PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic Area: Area A

Description

This measure would reduce the opacity limit in Maricopa County Rule 310 to 10%.

Title: Development of Opacity Coupon for Contractors to Use
Origin: Stationary and Area Source Subcommittee
Pollutants: PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic area: Area A

Description

This measure would develop an opacity coupon, for use in the field by contractors, to assess compliance with the opacity rule.

Title: Alternative to Expanding Area A is to Create Area C
Origin: Stationary and Area Source Subcommittee
Pollutants: PM₁₀, PM_{2.5}
Category: Stationary and Area Source
Geographic area: Area A

Description

This measure would create an Area C rather than expand the current Area A in order to develop compliance plans which are specific to the area.