# Final Staff Report
# SB656
# Assessment and Control Measure Evaluation

**July 28, 2005**


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## Executive Summary

Exposure to particulate pollution is linked to increased frequency and severity of asthma attacks, pneumonia and bronchitis, and premature death in people with pre-existing cardiac or respiratory disease. Those most sensitive to particle pollution include infants and children, the elderly, and people with heart and lung disease. Small particles can pass through the nose and throat to reach deep into the lungs. Research suggests the smallest particles may penetrate the lung walls. Some particles, such as diesel smoke, are toxic.

Particulate matter is not a single pollutant. It consists of a mixture of very small liquid and solid particles suspended in the air. Health concerns are linked to particles smaller than 10 microns in size (PM10), and the subset of fine particles smaller than 2.5 microns in size (PM2.5). Particles with a size between 2.5 and 10 microns are often referred to as coarse particles. State and federal ambient air quality standards have been set for both PM10 and PM2.5. Sacramento County exceeds the state standards for both PM10 and PM2.5, but has attained the less protective federal standards.

In 2003, Senate Bill 656 (SB 656, Sher) was codified as Health and Safety Code (H&SC) section 39614, to reduce public exposure to PM10 and PM2.5 and make progress toward attainment of state and federal standards. SB 656 requires the California Air Resources Board (CARB), in consultation with local air districts, to adopt a list of the most readily available, feasible, and cost-effective control measures that could be employed by CARB and the air districts to reduce PM10 and PM2.5 (collectively referred to as PM). CARB adopted that list in November 2004.

By July 31, 2005, SB656 requires CARB and air districts to adopt implementation schedules for appropriate CARB and air district measures. Finally, no later than January 1, 2009, CARB must prepare a report describing actions taken to fulfill the requirements of the legislation as well as recommendations for further actions to assist in achieving the State PM standards. SB656 requirements sunset on January 1, 2011, unless extended.

Staff's evaluation shows that the largest sources of PM are combustion sources including motor vehicles, wood burning, and cooking. Although fugitive dust sources contribute a substantial amount of PM10 to the inventory, ambient monitoring suggests that the dust contribution at the monitoring site is smaller.

Staff is assessing the costs and benefits of measures on CARB's approved list of measures. Staff is seeking Board of Directors approval, after public input, of a proposed schedule for implementing the control options. The schedule was:

- Mid-April 2005 – Completed technical assessment
- June 6, 2005 – Public Workshop on proposed list of measures and implementation schedule

- July 28, 2005 – Board Hearing for adoption of the implementation schedules

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**Health Effects of Particulate Matter**

Particles in the air (particulate matter) are a mixture of solids and liquid droplets that vary in size. Particles less than ten micrometers in diameter pose the greatest health concern because they can pass through the nose and throat and lodge deep within the lungs. Particles larger than ten micrometers do not usually reach the lungs, but can irritate the eyes, nose and throat.

Short-term exposures to fine and coarse PM lasting 24 hours or less can cause a variety of serious health problems. People with heart or lung diseases and older adults are more at risk of hospital or emergency room visits, and in some cases even death. Long-term exposures of a year or more have been linked to the development of lung diseases, such as chronic bronchitis and asthma, and heart diseases, such as congestive heart failure, coronary artery disease, cardiac arrhythmias and heart attacks. (USEPA AIRNow, 12/15/2004) Long-term exposure to combustion-related PM2.5 has also been identified as an environmental risk factor for cardiopulmonary and lung cancer mortality (JAMA, Journal of the American Medical Association, 3/6/2002).

Coarse (2.5 – 10 ug/$m^3$) PM is mostly deposited in the upper respiratory track while ultra fine (<1 ug/$m^3$) and fine (1 – 2.5 ug/$m^3$) PM are deposited throughout the respiratory track. An American Cancer Society study (Pope et al., 1995, 2002) that followed more than a half million adults from 151 cities for 16 years found there was an increased risk of lung cancer and an average 1.5 year loss in life expectancy (10 years per premature death) between the least and most polluted cities.

Some components of PM2.5 are toxic. One common toxic component is diesel smoke, which was identified as a toxic air contaminant by the California Air Resources Board. Compounds found in the vapor phase of diesel exhaust include benzene, formaldehyde, 1-3-butadiene and ethylene dibromide. At least 16 hydrocarbons that are classified as possibly carcinogenic are adsorbed on diesel exhaust particles (Health Risk Assessment for Diesel Exhaust, CalEPA, May, 1998). Residential wood smoke contains over 100 different chemicals, including dioxins, formaldehyde, benzene, toluene, oxygenated polycyclic aromatic hydrocarbons (PAHs), sulfur dioxide, lead, cadmium, arsenic and methyl chloride (Burning Issues/Clean Air Revival, Inc., June 6, 2001).

Carbonaceous particles in wood smoke contain a class of carcinogenic compounds known as polycyclic organic matter (POM), a complex mixture of

organic compounds. A USEPA paper[1] estimates that the cancer unit risk is 12 times greater for POM from wood smoke than for an equal mass of POM from tobacco smoke. This ratio is based on a comparative potency method that relates human lung cancer data from epidemiological studies to skin tumor-initiation dose-response studies of mice.

Free radicals are highly reactive organic chemicals that are found in smoke. Evidence shows that radicals contained in wood smoke have much longer lifetimes than radicals contained in tobacco smoke[2]. Radicals in wood smoke were observed to persist for more than 20 minutes, while radicals from tobacco smoke disappeared within about 10 seconds. Assuming the typical human smoking pattern, a cigarette smoker is exposed to cigarette smoke radicals for about 30 seconds per cigarette (20 seconds of puffs plus 10 seconds for radicals from the last puff to disappear), about 40 times less radical exposure than a person exposed to wood smoke.

Diesel PM emissions are less than five percent of all District PM emissions. Statewide, diesel PM contribute about 70 percent of the cancer risk associated with all currently identified toxic air contaminants (ARB, 10/18/2004, Staff Report, Proposed List of Measures to reduce Particulate Matter).

Backyard burning is another source of PM in the Sacramento area. Residential waste contains plastics, metals and synthetic materials that create dangerous chemicals when burned, including dioxins, benzene, PCBs (polychlorinated biphenyls) and other compounds that are known to cause respiratory ailments and are potentially carcinogenic.

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**Characterization of Ambient PM10 and PM2.5 in Sacramento**

Particulate matter is not a single pollutant. It consists of a mixture of very small liquid and solid particles suspended in the air. Ambient PM is comprised of both directly emitted PM such as dust or soot, known as primary PM, as well as PM formed in the atmosphere from the reactions of precursor gases, known as secondary PM.

Precursor gases include nitrogen oxides (NOx), sulfur oxides (SOx) volatile organic compounds (VOC), and ammonia. NOx, SOx, and ammonia combine to form secondary ammonium nitrate and ammonium sulfate. VOCs can form

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[1] Lewtas, J., *Carcinogenic Risks of Polycyclic Organic Matter (POM)*, Proceedings of the Conference on Chemical Risk Assessment in the DoD: Science, Policy, and Practice, Dayton, Ohio, April 8-11, 1991.

[2] Pryor, William A. *Biological Effects of Cigarette Smoke, Wood Smoke, and the Smoke from Plastics: The Use of Electron Spin Resonance*, Free Radical Biology & Medicine, Vol. 13, pp. 659-676, 1992.

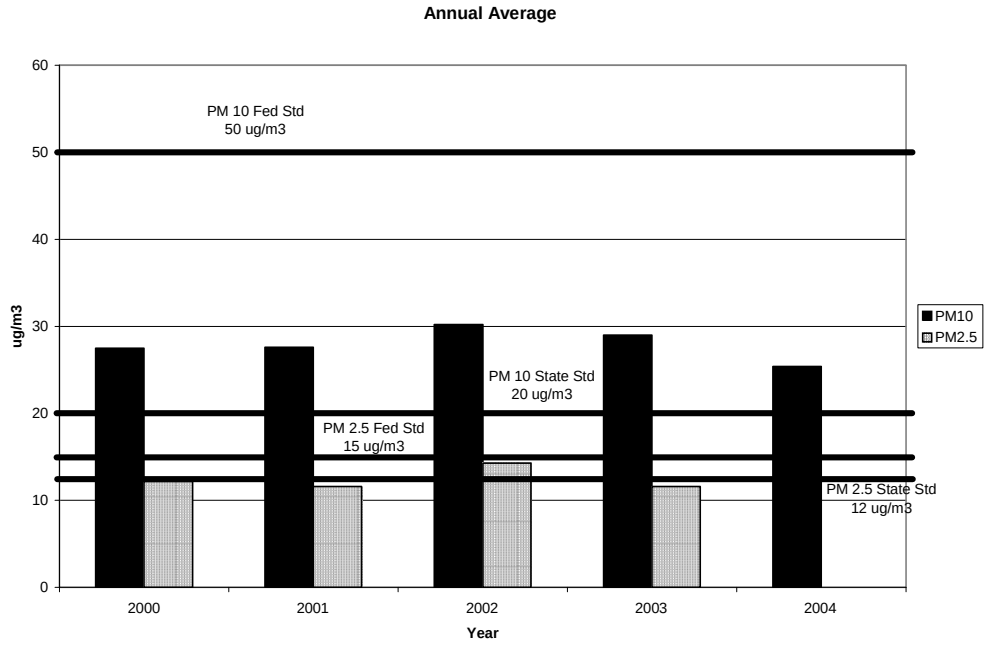
secondary organic aerosols, as well as participate in the production of secondary ammonium nitrate.

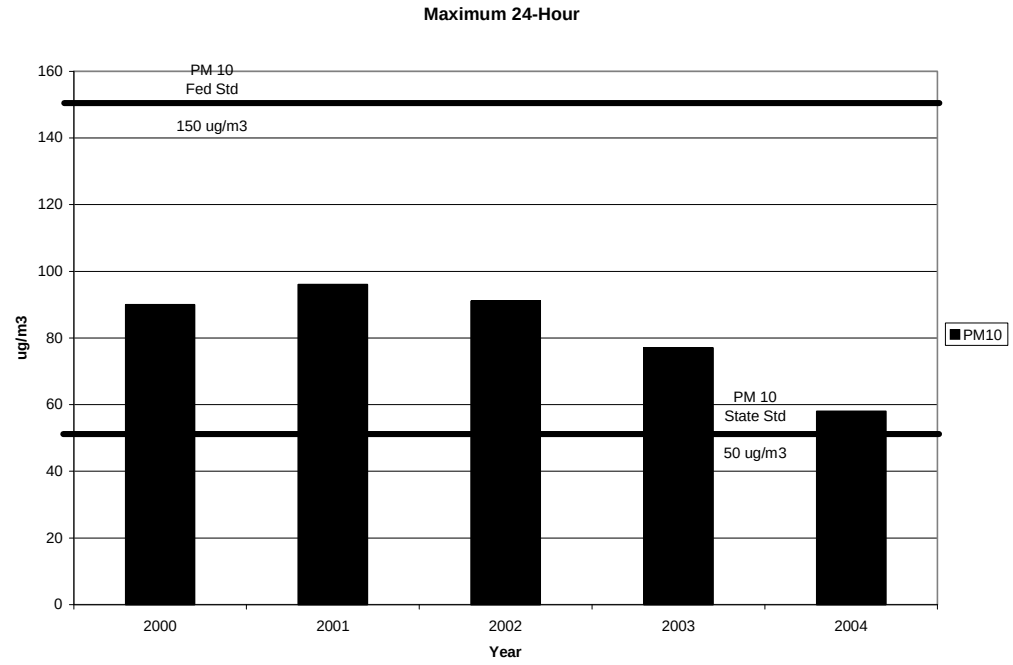
As discussed above, ammonia combines with NOx and SOx emissions to form ammonium nitrate and ammonium sulfate, especially in the wintertime. Analysis[3] has been done to assess impacts from excess ammonia in the ambient air in the area of a new power plant. CARB performed a simple mass balance on data from the 13th/T Street air monitoring station. The analysis suggested that Sacramento was ammonia-rich and an increase in ammonia would not increase PM levels. This suggests that ammonia reductions, unless they are very large, will not improve particulate levels.

[3] "Appendix B-2 – SOx for PM10 Interpollutant Trade Analysis, Final Determination of Compliance for SMUD Cosumnes Power Project, October 21, 2002"

## Attainment status

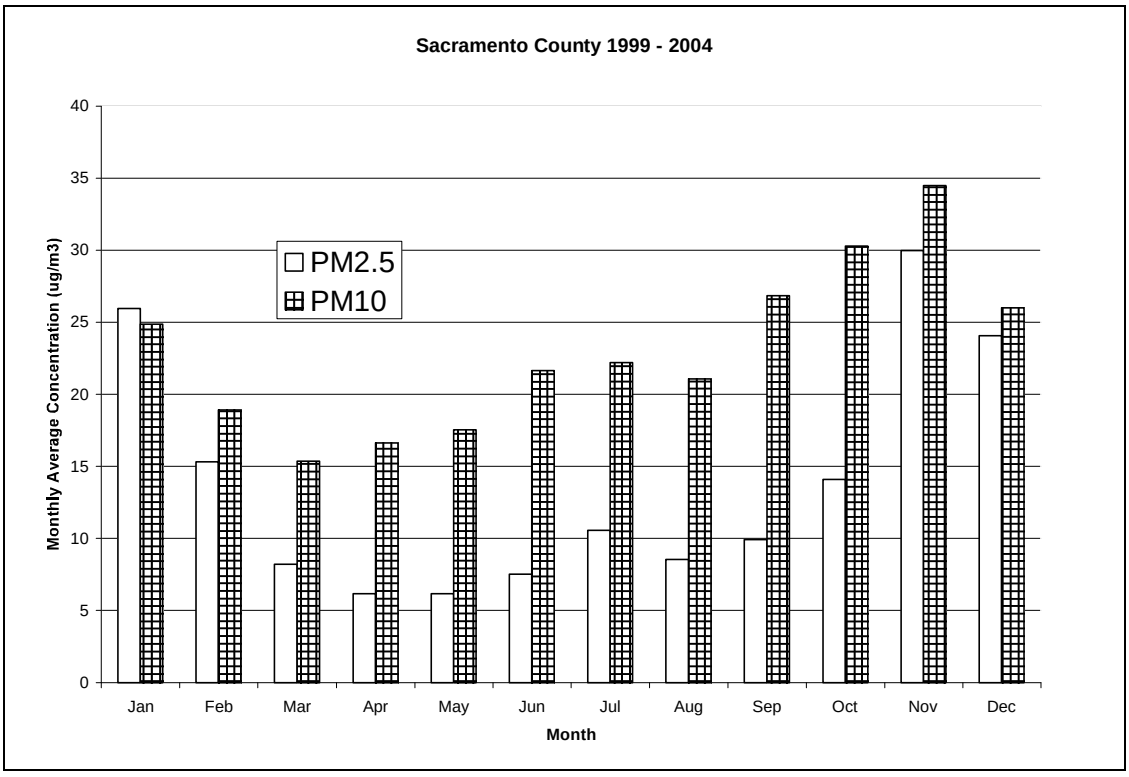
The charts below show the attainment status for state and federal standards for PM10 and PM2.5. There are two ambient air quality standards: an annual average for PM10 and PM2.5 and a 24 hour PM10 standard. Currently, there is only a federal 24 hour PM2.5 standard which is based on a 98$^{th}$ percentile, which Sacramento County has attained.



## Seasonal variations

In the Sacramento area, there is a seasonal variation in PM, with higher PM10 and PM2.5 concentrations in the fall and winter months. A major contributor to high levels of ambient PM2.5 in this area in the winter is the secondary formation of ammonium nitrate from precursors emitted by stationary and mobile combustion sources. In the winter, PM10 and PM2.5 concentrations can remain elevated for extended periods. Increased activity for some emission sources (e.g., wood combustion in stoves and fireplaces) and typical winter meteorological conditions are conducive to the buildup of PM. The figure below illustrates the monthly variation of the average PM10 and PM2.5 concentrations from 1999 to 2004.

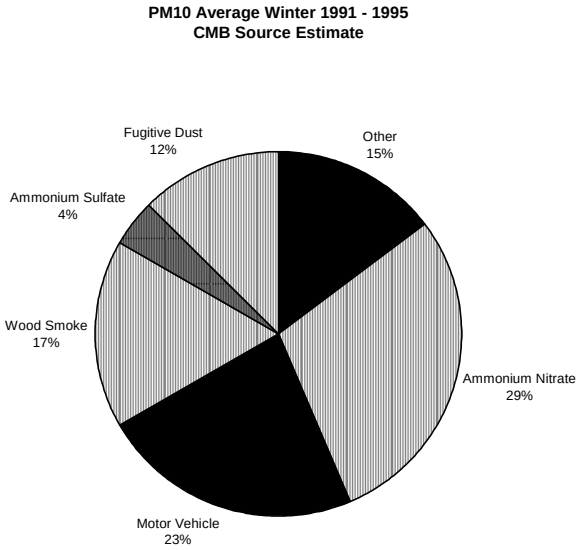


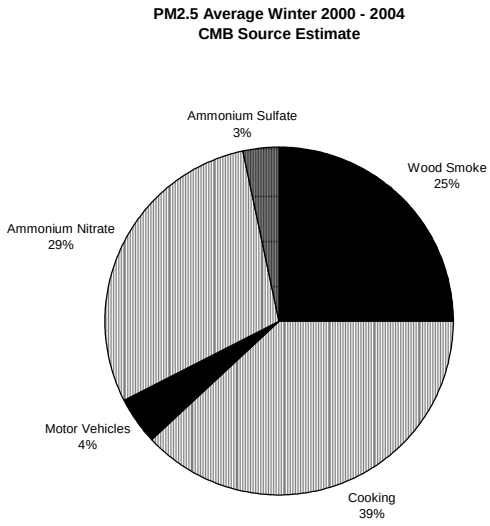

## Source contributions from ambient monitoring data

The District operates monitors to assess the various chemical species contributing to PM2.5. This data, combined with chemical "fingerprints" for various emissions sources, allows us to determine the relative contributions from the various sources on monitored air quality at the Del Paso Manor station. These analyses are called chemical mass balances (CMB). Similar data was gathered by CARB to assess the impact of various sources on PM10 levels. Staff has performed evaluations for the higher wintertime values. Because the

District has only one chemical speciation sampler, this represents values from the urban areas. The results in rural areas may differ.

Data for the illustrations below are from analysis of ambient air collected in Sacramento County for the winter from 1991 through 1996 for PM10 and from 2000 through 2004 for PM2.5. The constituents shown can vary based on a variety of factors, such as meteorology and which particulate sources are most active.




The data shows that during the winter, wood smoke from residential fireplaces is a significant source of both coarse and fine particulate. In addition, for fine particulates, cooking is a significant contributor[4]. Typical winter conditions – cool temperatures, low wind speeds, low inversion layers, and high humidity – also favor the formation of nitrates, which is a secondary particulate that forms from combustions sources such as motor vehicles and other fuel combustion.

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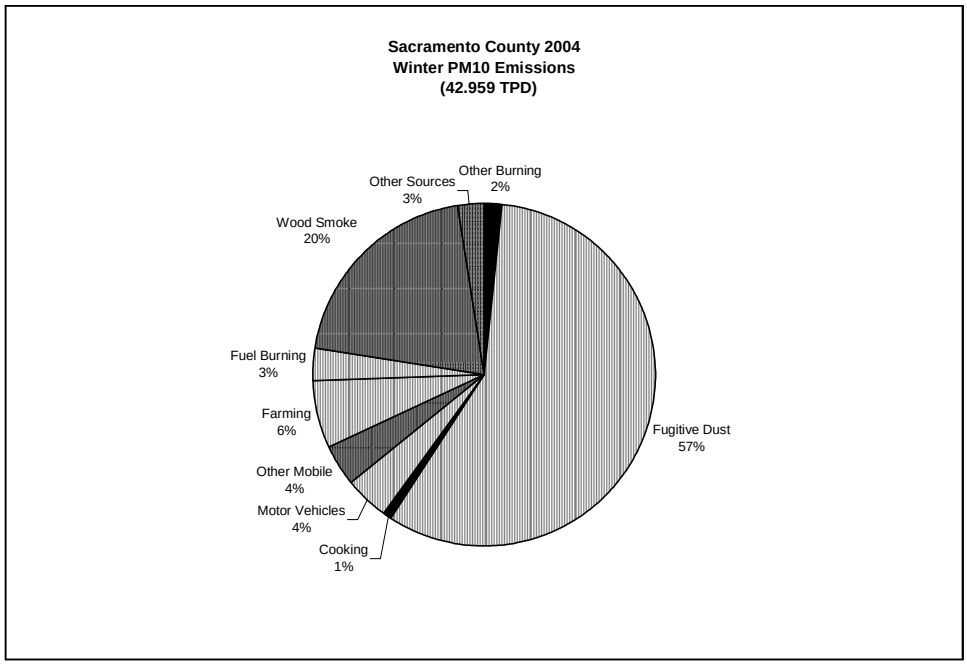
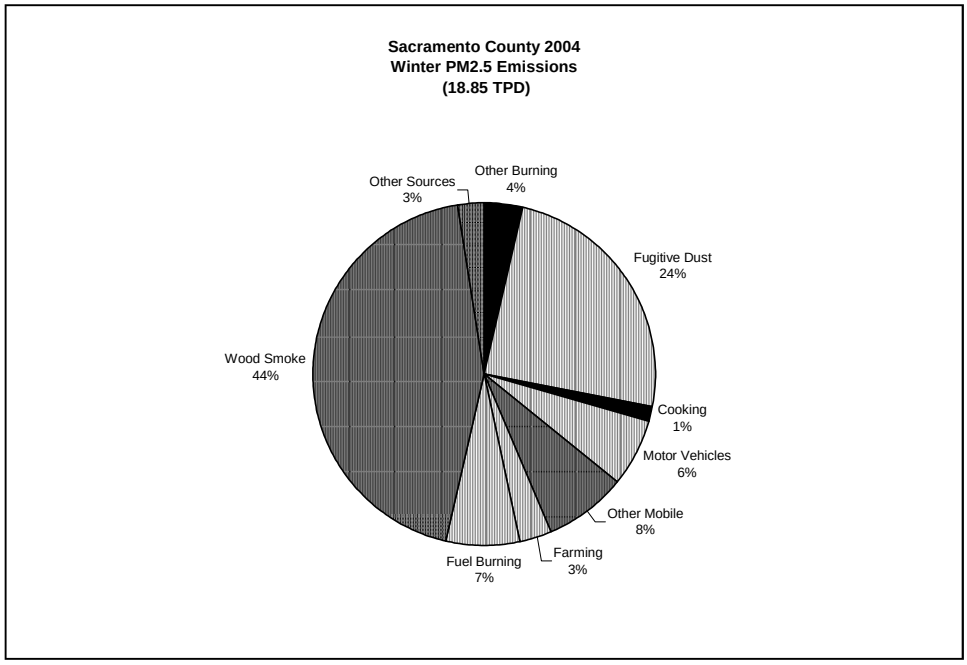
## Emission sources

Sources of ambient PM include combustion sources such as trucks and passenger cars, off-road equipment, industrial processes, residential wood burning, and forest and agricultural burning; fugitive dust from paved and unpaved roads, construction, mining and agricultural activities; and ammonia

[4] Note that cooking does not appear in the PM10 analysis. At the time that analysis was performed cooking was not evaluated. Cooking contributions likely appear in the "other" category.

from sources such as livestock operations, fertilizer application, and motor vehicles. In general, combustion processes form fine particles, whereas emissions from dust sources tend to be coarse particles. An average winter day emission inventory for directly emitted PM2.5 and PM10 is summarized in the following pie charts.



## Background of CARB List Development

As required by Senate Bill 656, CARB approved a list of the most readily available, feasible, and cost-effective control measures that can be employed by air districts to reduce PM at their November 18, 2004 Board meeting. The list is based on rules, regulations, and programs existing in California as of January 1, 2004, for stationary, area-wide, and mobile sources. The list, entitled *Appendix C – Air District Measures*, can be found at the following website: http://www.arb.ca.gov/pm/pmmeasures/pmmeasures.htm.

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## Potential List of Recommended Control Measures

SB656[5] requires air districts to adopt implementation schedules for selected measures from the list by July 31, 2005. The implementation schedules will identify the appropriate subset of measures, and the dates for final adoption, implementation, and the sequencing of selected control measures. In developing the implementation schedules, each air district will prioritize measures based on the effect individual control measures will have on public health, air quality, and emission reductions and on the cost-effectiveness. Consideration is also given to ongoing programs, such as measures being adopted to meet federal air quality standards or the State ozone planning process.

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## Process for Identifying Promising Potential Control Measures

Staff started with the recommended list of measures that was adopted by CARB in November 2004 and has augmented that list for any measures that have been adopted since January 1, 2004.

Many of the control measures on CARB's list are already being implemented by the District, including:

- Rules to control secondary PM precursors (NOx, VOC, and SOx) from combustion and coating sources.
- Rules to control directly emitted PM from incinerators and fuel burning equipment.
- "Grain loading" rules for emissions from asphalt plants, combustion sources, material dryers, and others.
- A rule to control agricultural burning.
- General visible emission limits (opacity).
- Incentive programs for diesel engine replacements, vehicle/equipment modernization, engine retrofits, and alternative fuel purchases.

[5] Health & Safety Code Section 39614(d)(1)

In addition, many of the measures on the list were recommended for commitment as part of the 2003 Triennial Report that the Board heard in April 2005. The complete list of already adopted measures and measures already recommended for adoption are included in Appendix A.

Staff also assessed CARB's list for measures that the District did not have sources or the potential for emission reduction was minimal. Those measures are identified in Appendix B. For the measures included in that Appendix that had inventory but minimal emission reduction potential, they were screened out.

Appendix C lists promising potential control measures that will be further evaluated. These measures include:

- Control of combustion emissions from residential wood burning fireplaces and wood burning heaters.
- Control of fugitive dust emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, inactive disturbed land, track-out resulting from construction and demolition operations, and vehicle travel on paved and unpaved roads.
- Control of chain-driven charbroiler operations.
- On-Road Motor Vehicle Mitigation Option

For these measures, staff identified the potential emission benefit and cost effectiveness by applying information from rulemaking documents from other districts. The results of this preliminary analysis are included in Appendix C. These analyses are preliminary and there is additional information needed to evaluate the actual benefits and impacts for Sacramento County.

The implementation schedule will include a date for the full analysis of each measure. If the analysis confirms preliminary analysis supporting a cost effective benefit from the measure, then the rule development work for the measure will begin. The rule development process will include additional public input on the measure.

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**Prioritization of Control Measures by Cost Effectiveness**

The table below identifies the control measures, identified in Appendix A, that have the potential to have an affect on public health, air quality, and emissions reductions. These measures are listed in order from the most cost-effective to the least cost-effective. The cost effectiveness data is taken from other districts' rule making documents. In the next section, a schedule for completing a further study analysis and for adopting and implementing the measure, if appropriate, has been identified.

Control Measures Being Analyzed for PM10 and PM2.5 Emission Reductions
(In Order of Most Cost-Effective to Least Cost-Effective)

| Control Measure Category | Specific Control Measure | Cost Effectiveness $/ton |
|---|---|---|
| Wood Burning | Require use of USEPA-Certified Phase II or equivalent devices | Cost Savings - $5,216 |
| Wood Burning | Restrict number of wood burning fireplaces allowed in new residential developments. Control of wood moisture content. Prohibit burning materials that are not intended for use in fireplace/heater. | $0 - $1,719 |
| Wood Burning | Public Awareness Program or Public Awareness Program with either a voluntary curtailment or mandatory curtailment | $0 – Undetermined |
| Fugitive Dust | Limits PM emissions from vehicle travel on paved roads by requiring use of PM10-efficient street sweepers by governmental agencies or their contractors. | $33 - $2,850 |
| Fugitive Dust | Limits PM emissions from vehicle travel on unpaved roads. | $56 - $12,293 |
| Fugitive Dust | Limit PM emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, inactive disturbed land and from track-out resulting from construction and demolition operations. | $197 - $10,000 |
| Combustion | Add-on control for chain-driven charbroilers | $3,148 |
| Wood Burning | Require replacement of non-certified units upon sale of property. | $5,240 - $12,060 |
| Transportation | On-Road Motor Vehicle Mitigation Option | $10,000 - $13,000 |

## Further Study, Adoption and Implementation Schedule

Staff has prioritized the additional control measures based on air quality impacts, cost-effectiveness, and other factors. This implementation schedule includes a date for completing the further study of benefits and impacts in Sacramento, consideration of adoption of the measure by the Board of Directors and implementation dates consistent with schedules used by other districts. These measures will be integrated into the District's rulemaking calendar along with the NOx and VOC precursor commitments that are part of the 2003 Triennial Report, and other rulemaking obligations.

As shown previously, the data indicates that during the winter, wood smoke from residential fireplaces is a significant source of both coarse and fine particulate. In addition, for fine particulates, cooking is a significant contributor to ambient measurements even though the inventory of directly emitted particulate is low. For coarse particulates, fugitive dust is a significant part of the inventory, but a smaller part of ambient monitoring results. Winter conditions – cool temperatures, low wind speeds, low inversion layers, and high humidity – also favor the formation of nitrates, which is a secondary particulate that forms from combustions sources such as motor vehicles and other fuel combustion.

Data obtained from the Sacramento dichotomous sampler[6] show that in 1999 and 2000, the PM2.5 portion of PM10 ranged from 13% to 86% on any given day. The two-year average winter PM2.5 portion of PM10 was 68% and the average summer PM2.5 portion of PM10 was 43%. In determining the implementation schedule, priority will be given to predominantly PM2.5 and precursor measures like residential wood burning and charbroilers, because these measures will affect both the PM2.5 and PM10 ambient contributions because, on average, PM2.5 contributes significantly to PM10.

PM Control Measures and Schedule

| **Control Measure** | **Further Study Completed** | **If Cost-effective Emission Benefit Determined** | |
|---|---|---|---|
| | | **Consideration by the Board** | **If adopted, Full Implementation Date** |
| **Wood Burning Fireplaces and Wood Burning Heaters** | | | |
| Require use of USEPA-Certified Phase II or equivalent devices | 2006 | 2007 | 2008 |
| Public Awareness Program with either a voluntary curtailment or mandatory curtailment | 2006 | 2007, if adopted program needed | 2007 |
| Require replacement of non-certified units upon sale of property* | 2006 | 2007 | 2008 |
| Restrict number of wood burning fireplaces allowed in new residential developments* | 2006 | 2007 | 2008 |
| Control of wood moisture content. Prohibit burning materials that are not intended for use in fireplace/heater. | 2006 | 2007 | 2008 |
| **Combustion** | | | |
| Add-on control for chain-driven charbroilers | 2007 | 2008 | 2009 |

[6] Characterization of Ambient PM10 and PM2.5 in California, CARB, December 2001

| Control Measure | Further Study Completed | If Cost-effective Emission Benefit Determined | |
|---|---|---|---|
| | | Consideration by the Board | If adopted, Full Implementation Date |
| **Fugitive Dust** | | | |
| Limit PM emissions from vehicle travel on paved roads by requiring use of PM10-efficient street sweepers by governmental agencies or their contractors | 2008 | 2009 | 2013 |
| Limit PM emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, inactive disturbed land and from track-out resulting from construction and demolition operations | 2009 | 2010 | 2011 |
| Limit PM emissions from vehicle travel on unpaved roads | 2010 | 2011 | 2016 |
| **Transportation** | | | |
| On-Road Motor Vehicle Mitigation Option | 2012 | 2014 | 2015 |

* The approval of these measures is likely to be model ordinances.

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## Public Comments

Staff held a public workshop on June 6, 2005 to discuss the proposed control measures for implementation of the SB656 program. Staff received comments on the proposed control measures for agricultural sources and for wood burning. Staff removed the proposed control measure for agricultural operations since this control measure results in minimal emissions reductions and would adversely impact agricultural operations. Additionally, farmers have indicated to Staff that they already avoid tilling on high wind days to reduce fire hazard. The comments and their responses are included in Appendix D of the staff report.

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## CEQA

The proposed action for the Board of Directors is to approve the list of control measures (Appendix C) that staff will study further for feasibility based on emission reduction benefit and cost effectiveness. The most promising measures will be developed for adoption and implementation according to the Board-approved schedule.

The District Environmental Coordinator has determined that the proposed action is statutorily exempt from the California Environmental Quality Act (CEQA) under Section 15262 of the State CEQA Guidelines (SCG) – Feasibility and Planning Studies. Feasibility or planning studies for possible future actions that have not been approved, adopted or funded do not require the preparation of an environmental impact report or negative declaration, but do require the consideration of environmental factors (SCG §15262).

Environmental Factors. All of the proposed measures will have a beneficial impact on air quality by reducing emissions of particulate matter or its precursors. Some of the control measures identified for feasibility studies and possible future implementation propose to curtail or modify behavior at times when particulate matter emissions are greatest or conditions favor their formation or concentration (e.g., wood burning public awareness program, wood burning restriction in new residential developments and on-road vehicle mitigation option for employee commutes). Two residential wood burning measures propose to install new or replace existing wood burning devices with more efficient USEPA-certified units. One measure (Commercial Charbroiling) proposes to require add-on controls for chain-driven charbroilers. The Ventura County APCD found that a similar measure they adopted last year (Rule 74.31 – Restaurant Cooking Operations) would not result in any significant adverse environmental effects. One proposed fugitive dust measure would require PM10-efficient street sweepers. An increase in street sweeper exhaust emissions may result to the extent that additional street sweeping is required beyond current levels. Some controls proposed for the construction and demolition measure and the unpaved roads measure include the application of chemical stabilizers. Soil stabilizers that are not environmentally benign could potentially affect surface or ground water supplies. The unpaved roads control measure also proposes to prohibit new permanent unpaved roads which could potentially lead to increased short-term emissions from paving equipment and asphalt off-gassing.

At this preliminary stage the proposed control measures do not appear to impact adversely any other environmental resources, such as land use and planning, biological or cultural resources, or public services because they will not require the construction or relocation of new facilities and are generally expected to impose control requirements on existing facilities and activities. The District will make the appropriate determinations and analysis under CEQA for those control measures proposed for implementation during the initial rules process.

## Conclusion

After analysis of Health and Safety Code Section 39614, District staff is proposing an implementation schedule for nine additional control measures to reduce PM2.5 and PM10 ambient concentrations in the Sacramento area and make progress towards attainment of the state air quality standards.

# APPENDIX A

# CONTROL MEASURES EXCLUDED

# (DISTRICT ALREADY HAS ADOPTED OR WILL BE PROPOSING AS PART OF 2003 TRIENNIAL PLAN)

| Strategy | Comment |
|---|---|
| **Combustion Sources** Measures reduce NOx, VOC, CO, ammonia, PM10 or PM2.5**.** | |
| Boilers, Steam Generators, and Process Heaters (NOx) | Rule amendments in progress, proposed commitment in the 2003 Triennial Report |
| Turbines (NOx, ammonia) | Rule already in place for NOx limits and all turbines <5 ppm. Ammonia reduction would not be large enough to affect PM concentrations. |
| IC Engines (NOx, VOC) | Rule amendments in progress, proposed commitment in the 2003 Triennial Report |
| Residential Water Heaters (NOx) | Rule amendments in progress, proposed commitment in the 2003 Triennial Report |
| **Storage, Transfer, and Dispensing Operations** Measures reduce VOC | |
| Gasoline Transfer and Dispensing Facilities | Rule already in place. No further amendments are needed. |
| Organic Liquid Loading | Rule amendments in progress, proposed commitment in the 2003 Triennial Report |
| **Leaks and Releases** Measures reduce VOC | |
| Equipment Leaks (Valves and Flanges) | A rule is already in place. A new rule amendment is in progress, proposed commitment in the 2003 Triennial Report |
| **Product Manufacturing** Measures reduce VOC | |
| Food Product Manufacturing and Processing | Proposed further study measure in the 2003 Triennial Report |
| Pharmaceuticals and Cosmetics Manufacturing Operations | Rule already in place. No further amendments are needed. |
| Polyester Resin Operations | Rule already in place. Proposed further study measure in the 2003 Triennial Report. |
| **Coating Operations** Measures reduce VOC. | |
| Adhesives and Sealants | Rule already in place, proposed commitment in the 2003 Triennial Report. |
| Architectural Coatings | Rule already in place. Planned for amendments as part of 8-hour ozone reduction commitment. |
| Glass Coatings | Will be regulated by proposed rule for unspecified coatings, proposed commitment in the 2003 Triennial Report |
| Graphic Arts | Rule already in place. No further amendments are needed. |
| Paper, Fabric, and Film Coating Operations | No sources in the District, these categories will be included in unspecified coating rule, proposed commitment in the 2003 Triennial Report. |
| Plastic, Rubber, and Glass Coatings | Will be regulated by proposed rule for unspecified coatings, proposed commitment in the 2003 Triennial Report. |
| Screen Printing Operations | Rule already in place. No further amendments are needed. |

| Strategy | Comment |
|---|---|
| Vehicle Refinishing | Rule already in place, proposed further study measure in the 2003 Triennial Report. |
| Wood Products Coatings | Rule already in place. No further amendments are needed. |
| **Solvent Cleaning and Degreasing** Measures reduce VOC. | |
| Cleaning Operations | Rule already in place, proposed commitment in the 2003 Triennial Report. |
| Degreasing Operations | Rule already in place, proposed commitment in the 2003 Triennial Report. |
| Use of Solvents (VOC) | Rules already in place. No further amendments are needed. |
| **Miscellaneous**<br>**Measures reduce VOC, SOX, ammonia, or PM10 and PM2.5.** | |
| Soil Decontamination (VOC) | Policy already in place. No further amendments are needed, no sources in the inventory. |
| Woodworking Operations (PM10) | Regulated under BACT and other visible emissions regulations. No further rules are required. |
| Solid Waste Landfills (VOC) | Sources already controlled by district rules. No further rule revisions are required. |
| **General Rules to Reduce Directly Emitted PM from Stationary and Area Sources**<br>These rules are generic and apply to sources that may not be regulated through a specific rule or permit requirement. The rules are intended to reduce directly emitted PM10 and PM2.5. | |
| Visible Emission Limits | Rule already in place |
| Combustion Contaminants (PM10, PM2.5) | Rule already in place |
| Grain Loading (PM10) | Rule already in place |
| **Programs that Reduce PM Emissions from Mobile Sources Measures** primarily reduce directly emitted PM10, PM2.5, NOx, and VOC. | |
| **Incentive Programs** (PM10, PM2.5, NOx)<br>A funding source is needed in order to rely on incentives programs.<br><br>***DMV Funds (AB 2766 Funds): Motor Vehicle Registration Fee Program (Many districts implement this program)*** | Programs already in place. No further revisions are needed. |
| Heavy-Duty Engine Incentive Program<br>Lower Emission School Bus Program<br>Lower Emission School Bus Program<br>Moyer Program<br>Sacramento Emergency Clean Air Transportation (SECAT) Program<br>Light and Medium Duty Vehicle Program<br>Lawn Mower Buy Back Program | Programs already in place. |

| Strategy | Comment |
|---|---|
| Transportation Related Programs (PM10, PM2.5, NOx, VOC, CO)<br>Transportation Outreach Program<br>Spare the Air Program<br>Public Awareness Programs<br>Leveraging Other Sources for Transportation Funding | |
| **Transportation Related Programs** | |
| Spare the Air | Program already in place |
| Public Awareness Programs | Program already in place |
| Leveraging Other Sources for Transportation Funding | Program already in place |

# APPENDIX B

# REJECTED CONTROL MEASURES

# (NO SOURCES OR MINIMAL EMISSIONS OR MINIMAL EMISSION REDUCTION)

| Strategy | Comment |
|---|---|
| **Combustion Sources**<br>**Measures reduce NOx, VOC, CO, or PM10 and PM2.5.** | |
| Lime Kilns (NOx) | No sources in the District. |
| Cement Kilns (NOx, PM10, PM2.5) | No sources in the District. |
| Glass Melting Furnaces (NOx) | No sources in the District. |
| Central Furnaces | Inventory already assumes compliance with this control measure |
| **Composting and Related Operations**<br>**Measures reduce ammonia and VOC.** | |
| General Administrative Requirements | Negligible emissions inventory from this source category. |
| Chipping and Grinding Operations (Ammonia, VOC) | No sources in the District. |
| Composting (Ammonia, VOC) | Negligible emissions inventory from this source category. |
| **Product Manufacturing**<br>Measures reduce VOC | |
| Coatings and Ink Manufacturing | No sources in the District. |
| Fiberboard Manufacturing | No sources in the District. |
| Polymeric Cellular Products (Foam) | No sources in the District. |
| Surfactant Manufacturing. | No sources in the District. |
| **Coating Operations**<br>Measures reduce VOC | |
| Metal Container, Closure, and Coil Coating Operations | No sources in the District. |
| Magnet Wire Coating Operations | No sources in the District. |
| Marine Coating Operations | No sources in the District. |
| Metal Parts and Products | Limits VOC content, rule already in place, minimal reduction potential |
| Motor Vehicle Assembly Line Coating Operations | No sources in the District. |
| Spray Booth Facilities | No sources in the District. |
| Wood Flat Stock Coatings | No sources in the District. |
| **Non-Agricultural Open Burning**<br>Measures reduce PM10, PM2.5 and as added benefit VOC, NOx, CO, and air toxics | Negligible inventory. Only 0.7% of PM2.5 inventory and 0.3% of PM10 inventory |
| **Fugitive Dust** Measures reduce PM10 and PM2.5 | |

| | |
|---|---|
| Bulk Materials Handling/Storage | These emissions are included within other inventory categories. Emissions already controlled through public nuisance, opacity, fugitive dust rules, and permits. Minimal reduction potential. |
| Paved Road Dust - New/Modified Public and Private Roads | Small inventory and small portion of the contribution to ambient PM2.5 and PM10 concentrations |
| Weed Abatement Activities | No specific PM10 inventory for this category |
| Fugitive Dust from off-field sources | Minimal reduction potential. |
| Limit fugitive dust from paved and unpaved roads and livestock operations | Minimal emission inventory |
| Reduce fugitive dust from livestock feed yards | Minimal emission inventory |
| Agriculture Operations - Restrict tilling and mulching in high wind | Minimal emission reduction potential, and workshop comments demonstrated that it would place an unnecessary burden on the agricultural industry |
| **Transportation Related Programs** | |
| Transportation Outreach Program | No emission reduction potential from this measure |

# APPENDIX C

# POTENTIAL SB656 CONTROL MEASURES

| Control Measure Category | Specific Control Measure |
|---|---|
| Wood Burning | Public Awareness Program or Public Awareness Program with either a voluntary curtailment or mandatory curtailment |
| Wood Burning | Require use of USEPA-Certified Phase II or equivalent devices |
| Wood Burning | Require replacement of non-certified units upon sale of property. |
| Wood Burning | Restrict number of wood burning fireplaces allowed in new residential developments. Control of wood moisture content. Prohibit burning materials that are not intended for use in fireplace/heater |
| Combustion | Add-on control for chain-driven charbroilers |
| Fugitive Dust | Limit PM emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, inactive disturbed land and from track-out resulting from construction and demolition operations. |
| Fugitive Dust | Limits PM emissions from vehicle travel on unpaved roads. |
| Fugitive Dust | Limits PM emissions from vehicle travel on paved roads by requiring use of PM10-efficient street sweepers by governmental agencies or their contractors. |
| Transportation | On-Road Motor Vehicle Mitigation Option |

Wood Burning Fireplaces and Wood Burning Heaters

Public Awareness Program or Public Awareness Program with either a Voluntary Curtailment or Mandatory Curtailment

**Wood Burning Fireplaces and Wood Burning Heaters - Public Awareness Program or Public Awareness Program with Either a Voluntary Curtailment or Mandatory Curtailment**

Evaluator: Ali Mohamad/Aleta Kennard

**Control Measure Description**

There are two potential parts to this control measure. The first part is implementing a public awareness program. The second part is establishing a voluntary or mandatory curtailment program. Descriptions of these programs are below.

1. Provide a public awareness program about the health effects of residential wood burning and how these impacts can be minimized. Require retailers of new wood burning appliances to supply information to the public at the point of sale of wood burning appliances. Information distributed by the retailers will be in the form of pamphlets, brochures, or fact sheets on the following topics: proper operation and maintenance of wood appliances; proper sizing of wood appliances; proper fuel selection and use; weatherization methods for the home; proper fuel storage; and health benefits from low-emission wood burning appliances.

   A few districts have adopted the requirement for retailers to distribute the topic material, including: SJUAPCD, SLOAPCD, YSAQMD; BUTAQMD, and KERNAPCD. For the town of Mammoth Lakes, GBUAPCD has adopted a Pollution Reduction Education Program. In addition, the City of Sebastopol in the BAAQMD has adopted an Education Program.

2. Limit or prohibit the use of wood burning fireplaces or heaters on days when the Air Quality Standard Index is predicted to be high for PM. This program can be implemented through voluntarily curtailment by residents or by mandatory curtailment imposed by District rule.

   a. Voluntary Curtailment Program: The District can issue notices to the public informing them of the predicted high PM levels and asking them to curtail the use of wood in fireplaces and woodstoves. There are a number of districts that have included a voluntary curtailment program, including: FRAQMD, TEHAPCD, SHAAQMD, SLOAPCD, and GLENAPCD. All but one of the districts allow the APCO to issue an advisory to voluntarily curtail when PM10 is projected to exceed 60 ug/$m^3$. SLOAPCD triggers a voluntary curtailment when an impaired air quality episode occurs. The voluntary curtailment only affects non-certified devices. The City of Sebastopol has a voluntary curtailment when the BAAQMD determines that there will be a poor air quality episode.

b. District Mandated Curtailment Program: The District can issue notices to the public requiring that they do not use their wood burning fireplaces and woodstoves. People who do not comply will be issued a notice of violation. There are two districts that currently have an adopted mandatory curtailment, SJUAPCD and GBUAPCD for the town of Mammoth Lakes.

SJUAPCD notifies of a mandatory curtailment when the AQI reaches a value of 150 or greater. The curtailment affects all wood burning fireplaces and heaters except those 3,000 feet or more above sea level, locations where natural gas service is not available, and where the device is the sole source of heat for the residence.

For Mammoth Lakes, an Air Quality Manager appointed by the Town Council will notify of a mandatory curtailment when the PM10 levels reach 130 ug/m3 or when adverse meteorological conditions are predicted to persist. The curtailment affects all wood or solid fuel burning except devices certified as meeting EPA emission requirements.

## Targeted EIC Categories and Inventory

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.649 | 0.126 | 1.389 | 1.337 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 3.012 | 0.576 | 7.168 | 6.901 |
| | Total | 3.661 | 0.702 | 8.557 | 8.238 |

*Summer Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.065 | 0.013 | 0.140 | 0.135 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 0.303 | 0.058 | 0.721 | 0.695 |
| | Total | 0.368 | 0.071 | 0.861 | 0.830 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.357 | 0.069 | 0.764 | 0.736 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 1.657 | 0.317 | 3.943 | 3.796 |
| | Total | 2.014 | 0.386 | 4.707 | 4.532 |

## Emission Reductions

Voluntary/Mandatory Curtailment Measure: The emission reduction from a voluntary or mandatory curtailment program would depend on the compliance rate of the program. Because there could be penalties imposed, a mandatory program could achieve a higher compliance rate. Many of the districts that have a voluntary curtailment program have not estimated emission reductions from their programs. SJUAPCD, which adopted a mandatory program, estimated the maximum potential emission reductions from the program to be 78% from their curtailment program. This estimate assumed that the curtailment was in place for the entire District. SJUAPCD has had their mandatory curtailment program in effect for two years now. They have been operating their program with both a voluntary curtailment called at a lower AQI level, and then calling a mandatory curtailment when the 150 AQI is reached. This last season they called from 6 – 44 voluntary curtailments, depending on location. There were only 3 days of mandatory curtailments. A total of 44 violation notices were issued.

Public Awareness Measure: This measure may result in reductions in particulate matter emissions. However, the actual emission reductions cannot be quantified since there is no information available on the number of people that actually complied with the guidelines for proper use of their wood burning appliances.

## Cost Effectiveness

SJUAPCD has not calculated cost-effectiveness for these measures. They state that these sources are not subject to the California Clean Air Requirement for cost-effectiveness because they are not sources subject to District permit requirements and BARCT rules. SJUAPCD did perform a socioeconomic analysis and found that major industry sectors that will have greatest impact are the firewood production industry and hearth product services sector. They found that on balance, under worst case scenarios, the net impacts of the rule amendments would be a modest employment decrease of 55 jobs in the valley.

Voluntary/Mandatory Curtailment Measure: The cost would be zero dollars for most households since it does not require changing or modifying existing fireplaces or heaters.

Public Awareness Measure: There will be some additional costs to retailers and the District. The cost to retailers will be the in the form of preparing and distributing the informational material. The cost to the District will be the cost of staff resources and material cost to develop and implement the public awareness program. Actual costs to implement this program have not been quantified.

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJUAPCD | Retailer Public Information | Upon adoption | 7/17/03 |
| | Mandatory Curtailment | Three months from adoption | 11/1/03 |
| GBUAPCD – Town of Mammoth Lakes | Pollution Reduction Education Program | Unspecified | - |
| | Mandatory Curtailment | Unspecified, rule adopted in December 1990, curtailment may have been in effect the next winter | - |
| FRAQMD | Voluntary Curtailment | Upon adoption | 6/96 |
| TEHAPCD | Voluntary Curtailment | Unspecified | - |
| SHAAQMD | Voluntary Curtailment | Upon adoption | 3/1/94 |
| SLOAPCD | Retailer Public Information | Upon adoption | 10/19/93 |
| | Voluntary Curtailment | Upon adoption | 10/19/93 |
| GLENAPCD | Voluntary Curtailment | Upon adoption | |
| BUTAQMD | Retailer Public Information | Upon adoption | 10/25/01 |
| YSAQMD | Retailer Public Information | Upon adoption | 12/8/04 |
| City of Sebastopol | Education Program | 31 days after adoption | 10/03 |
| | Voluntary Curtailment | 31 days after adoption | 10/03 |
| KERNAPCD | Retailer Public Information | Upon adoption | 7/8/04 |

Depending on the program that was adopted the implementation time frames ranged from the date of adoption to three months from adoption.

Public Acceptability

The cost effectiveness of this measure is unknown. There are a number of districts that have adopted voluntary curtailment programs. Many of these programs have been in effect since the early to mid-1990's. The mandatory curtailment program has been in place in the Town of Mammoth since 1990, but the SJUAPCD mandatory program has only been in place for two years.

SJUAPCD has issued violation notices to residents that have burned on mandatory curtailment days.

Enforceability
A program for enforcing this measure still needs to be developed. In the San Joaquin Valley, notices of violation have been issued to residents if they were found to be burning on a mandatory curtailment day.

Resources:
Resources would be needed for outreach and enforcement. Actual funding sources have not yet been identified.

## Information Still Needed

The emission reduction potential and cost-effectiveness for the Sacramento District still needs to be evaluated. The compliances rates for the curtailment programs and the number of days of curtailment need to be estimated. The number of households that are improperly using their fireplaces would need to be estimated to analyze the impact of a Public Awareness Program. Costs to comply with the requirements would still need to be determined.

## References:

1. California Air Resources Board, Staff Report Proposed List of Measures to Reduce Particulate Matter – PM10 and PM2.5 (Implementation of Senate Bill 656, Sher 2003) Release Date: October 18, 2004
2. CARB Emission Inventory Data, CCOS SIP Data and Documentation, Annual and Seasonal Average Planning Inventory Report, Version 2.12
3. San Joaquin Valley Unified APCD, RULE 4901 WOOD BURNING FIREPLACES AND WOOD BURNING HEATERS; July 17, 2003
4. San Joaquin Valley Unified APCD, RULE 4901 WOOD BURNING FIREPLACES AND WOOD BURNING HEATERS; July 17, 2003
5. Background Model Wood Stove Ordinance, BAAQMD
6. REPORT ON REVISIONS TO 5TH EDITION AP-42, Section 1.10, Residential Wood Stoves; July 29, 1996

Wood Burning Fireplaces and Wood Burning Heaters

Require Use of USEPA-Certified Phase II or Equivalent Devices

**Wood-Burning Fireplaces and Wood-Burning Heater – Use of USEPA-Certified Phase II or Equivalent Devices**

Evaluator: Ali Mohamad/Aleta Kennard

**Control Measure Description**

This control measure would require all new wood burning fireplaces to have particulate matter emissions equal to or less than those of woodstoves, and require wood burning stoves to be USEPA-Certified, Phase II or equivalent. This provision would apply to all new residential construction projects. This includes housing units such as new homes, apartment buildings, and condominiums and the installation of fireplaces and wood stoves into existing housing units.

USEPA-Certified woodstoves emit less than 50% of the PM10 emissions of non-certified units. Additionally, USEPA-certified wood burning pellet stove emit 87% less than non-certified stoves. USEPA requires that all new woodstoves and inserts manufactured after July 1, 1990, or sold after July 1, 1992, meet USEPA Phase II certification.

There are two types of certified wood stoves and fireplace inserts – non-catalytic and catalytic. Currently, the most common stoves on the market are non-catalytic, but there are benefits to both. Catalytic stoves employ a catalytic converter which works as an afterburner to reduce wood smoke. The converter is a cast ceramic honeycomb coated with either platinum or palladium. Once the converter is pre-heated to light-off temperature (500–600 degrees Fahrenheit), the smoke is routed through the catalyst, which burns the tars, vapors and other organic compounds that make up wood smoke.

There are a number of districts that have adopted requirements for “wood-heating devices” to be USEPA-Certified Phase II or equivalent devices. There are differences in the rules in how a “wood-heating device” is defined. There are four districts, which include YSAQMD, BUTAQMD, GBUAPCD for the Town of Mammoth Lakes, and SLOAPCD, and the City of Sebastopol that include fireplaces in the definition of a wood-heating device. TEHAPCD, SHAAQMD, and GLENAPCD exclude fireplaces from the definition of wood heating device but set separate standard for fireplaces, either requiring a certified insert or that they meet <7.5 grams/hour of total particulate. The remainder of the districts, which includes FRAQMD, SJUAPCD, KERNAPCD, and PCAPCD for Squaw Valley, exclude fireplaces from the definition of a wood-heating device.

## Targeted EIC Categories and Inventory

Below are the current PM10 and PM2.5 emissions for the Sacramento County. The proposed control measure will reduce only the growth in emissions, since it applies to new homes.

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.649 | 0.126 | 1.389 | 1.337 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 3.012 | 0.576 | 7.168 | 6.901 |
| | Total | 3.661 | 0.702 | 8.557 | 8.238 |

*Summer Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.065 | 0.013 | 0.140 | 0.135 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 0.303 | 0.058 | 0.721 | 0.695 |
| | Total | 0.368 | 0.071 | 0.861 | 0.830 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.357 | 0.069 | 0.764 | 0.736 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 1.657 | 0.317 | 3.943 | 3.796 |
| | Total | 2.014 | 0.386 | 4.707 | 4.532 |

## Emission Reductions

According to BAAQMD, the average residence burns 0.28 cords of wood per winter season. BAAQMD staff estimated that for every 1000 new homes built with USEPA-certified wood burning fireplaces and/or stoves, three tons of PM10 are avoided each winter based on the assumptions that:

- the average residence burns 0.28 cords of wood per winter season;

- 90 percent of the homes have wood burning fireplaces; and
- 38 percent of homeowner's burn wood during the winter season.

USEPA-Certified wood stoves emit about 70% less PM10 than non-certified ones. Additionally, USEPA-certified wood burning pellet stoves emit 87% less than non-certified stoves.

To determine the emission reduction potential in the Sacramento District, the number of wood burning fireplaces constructed each year would need to be determined. An estimate of how many of those already use fireplace inserts would also have to be determined. The average amount of firewood used per fireplace in the Sacramento District would also need to be determined.

## Cost Effectiveness

The capital cost for a USEPA-certified wood burning appliance, including installation, ranges from $2,500-$3,500. A non-certified woodstove costs about $1500-$2,500.

The cost for a fireplace with a USEPA-certified fireplace insert ranges from $2500 to $3500. The incremental cost between a certified fireplace and an uncontrolled fireplace is around $1500.

The cost effectiveness of this measure is up to $5216/ton from the SLOAPCD rulemaking in 1991. There may be cost savings in chimney cleaning and wood costs.

The cost effectiveness for the Sacramento District still needs to be evaluated.

| Pollutants | Cost-Effectiveness ($/ton) |
|---|---|
| PM, NOx, VOC | $0 – $5,216 |
| | |

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJUAPCD | No new wood stoves or wood burning fireplace inserts unless it is EPA Phase II certified or is a pellet-fueled wood burning heater | Upon adoption (this is already an EPA requirement) | 7/17/03 |

| | | | |
|---|---|---|---|
| GBUAPCD – Town of Mammoth Lakes | No new solid fuel burning appliances unless it is EPA Phase II certified (includes any fireplace or wood heater) | 30 days from adoption | 1/1/91 |
| FRAQMD | No new wood heating devices unless it is EPA Phase II certified (does not include fireplaces and wood cook stoves) | Upon adoption (this is already an EPA requirement) | 6/96 |
| TEHAPCD | No new wood heating devices unless it is EPA Phase II certified (does not include fireplaces) | Upon adoption (this is already an EPA requirement) | 3/14/95 |
| | Fireplaces in new construction must either use EPA Phase II certified insert or meet <7.5 grams/hour of total particulate matter | Six months from adoption | 10/1/95 |
| SHAAQMD | No new wood heating devices unless it is EPA Phase II certified (does not include fireplaces and wood cook stoves) | Upon adoption (this is already an EPA requirement) | 3/1/94 |
| | Fireplaces in new construction must either use EPA Phase II certified insert or meet <7.5 grams/hour of total particulate matter | Four months from adoption | 7/1/94 |
| SLOAPCD | No new wood heating devices unless it is EPA Phase II certified (includes fireplaces) | Five months after adoption | 2/1/94 |
| GLENAPCD | No new wood heating devices unless it is EPA Phase II certified (does not include fireplaces) | Upon adoption (this is already an EPA requirement) | |
| | Fireplaces in new construction must either use EPA Phase II certified insert or meet <7.5 grams/hour of total particulate matter | Had a future implementation date but can't tell how long from the rule language | 7/1/95 |
| BUTAQMD | No new wood heating devices unless it is EPA Phase II certified (includes fireplaces) | Upon adoption | 10/25/01 |

| | | | |
|---|---|---|---|
| YSAQMD | No new wood heating devices unless it is EPA Phase II certified or <7.5 grams/hour for noncatalytic or <4.1 grams/hour for catalytic (includes fireplaces) | Upon adoption | 12/8/04 |
| City of Sebastopol | No new wood heating devices unless it is EPA Phase II certified or is a pellet-fueled appliance or is a dedicated gas log fireplace or gas stove (includes fireplaces) | 31 days after adoption | 10/03 |
| KERNAPCD | No new wood heating devices unless it is EPA Phase II certified (does not include fireplaces) | Upon adoption (this is already an EPA requirement) | 7/8/04 |
| PCAPCD for Squaw Valley | No new wood heating devices unless it is Oregon certified or <9 grams/hour for noncatalytic or <4 grams/hour for catalytic (does not include fireplaces) | Two years after adoption | 7/1/88 |

Depending on the program that was adopted the implementation time frames ranged from date of adoption to two years from adoption.

Public Acceptability
There are a number of districts that have adopted this type of program. Many of these programs have been in place since the early to mid-1990's.

Enforceability
This measure could either be adopted and enforced through the District adopting a regulation or it could be adopted and enforced through cities adopting an ordinance. There may be potential efficiencies if compliance is incorporated into the building inspection and review processes.

Resources
Actual funding sources have not been identified yet. Using fees to fund this program needs to be evaluated.

**Information Still Needed**

The emission reduction potential and cost-effectiveness for the Sacramento District still needs to be evaluated. The number of wood burning fireplaces constructed each year would need to be determined. An estimate of how many

of those already use fireplace inserts would also have to be determined. The average amount of firewood used per fireplace in the Sacramento District would also need to be determined.

**References:**

1. California Air Resources Board, Staff Report Proposed List of Measures to Reduce Particulate Matter – PM10 and PM2.5 (Implementation of Senate Bill 656, Sher 2003) Release Date: October 18, 2004
2. CARB Emission Inventory Data, CCOS SIP Data and Documentation, Annual and Seasonal Average Planning Inventory Report, Version 2.12
3. Background Model Wood Stove Ordinance, BAAQMD
4. Local dealers for stoves and fireplaces.
5. CBIA article "California Housing Boom to Continue", by CBIA Chief Economist Alan Nevin, California Builders Magazine, January/February 2005 Issue.
6. Buying and EPA-Certified Woodstove, United States Environmental Protection Agency, February 1990.
7. San Joaquin Valley Unified APCD, RULE 4901 WOOD BURNING FIREPLACES AND WOOD BURNING HEATERS; July 17, 2003

Wood-Burning Fireplaces and Wood-Burning Heaters

Require Replacement of Non-Certified Units Upon Sale of Property

**Wood-Burning Fireplaces and Wood-Burning Heaters – Replacement of non-certified appliances upon sale of property.**

Evaluator: Ali Mohamad/Aleta Kennard

## Control Measure Description

This control measure requires replacement of non-certified woodstoves and wood burning fireplaces upon sale of property. Currently, there are no certification requirements for wood burning fireplaces, but certified inserts are available as retrofits. Woodstoves sold after July 1992 must meet USEPA-Phase II certification requirements.

There are two districts, SJUAPCD and GBUAPCD for the Town of Mammoth Lakes, that have adopted requirements for non-certified "wood-heating devices" to be removed, replaced by an EPA Phase II certified device or rendered inoperable. The difference between the two is that SJUAPCD does not include fireplaces in their definition of a wood-heating device. The YSAQMD has developed a model ordinance for their cities which requires replacement upon sale, but none of their cities have committed to adopting that ordinance yet.

The City of Sebastopol's ordinance requires the removal of non-certified wood heaters upon remodel in certain circumstances. In addition, the City of Sebastopol will ban the use of non-certified burning appliances after June 1, 2005 except in specified hardships. The exemption for hardships expires on June 1, 2007.

Another option to be explored with this control measure is to develop an incentive program for replacing existing non-certified woodstoves and wood-fireplaces.

## Targeted EIC Categories and Inventory

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.649 | 0.126 | 1.389 | 1.337 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 3.012 | 0.576 | 7.168 | 6.901 |
| | Total | 3.661 | 0.702 | 8.557 | 8.238 |

*Summer Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.065 | 0.013 | 0.140 | 0.135 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 0.303 | 0.058 | 0.721 | 0.695 |
| | Total | 0.368 | 0.071 | 0.861 | 0.830 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.357 | 0.069 | 0.764 | 0.736 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 1.657 | 0.317 | 3.943 | 3.796 |
| | Total | 2.014 | 0.386 | 4.707 | 4.532 |

## Emission Reductions

According to BAAQMD, the average residence burns 0.28 cords of wood per winter season. BAAQMD staff estimated that for every 1000 new homes built with USEPA-certified wood burning stoves or fireplace inserts, three tons of PM10 are avoided each winter based on the assumptions that:

- the average residence burns 0.28 cords of wood per winter season;
- 90 percent of the homes have wood burning fireplaces; and
- 38 percent of homeowners' burn wood during the winter season.

USEPA-Certified wood stoves or fireplace inserts emit about 70% less PM10 emissions than non-certified ones. Additionally, wood burning pellet stoves emit 87% less than non-certified woodstoves.

The SJUAPCD estimated a 0.41 tons/day reduction in PM10 emissions from this requirement. That is about 2% of the total residential wood burning activities in the San Joaquin District. In calculating the reductions, they assumed a 10.5 year turnover sales rate from a report prepared and released by Chicago Title Company.

To determine the emission reduction potential in the Sacramento District, the number of homes sold each year which contained a non-certified wood burning appliance would need to be determined. The average amount of firewood used per fireplace in the Sacramento District would also need to be determined.

## Cost Effectiveness

The capital cost for a USEPA-certified wood burning appliance, including installation, ranges from $2,500-$3,500. A non-certified woodstove costs about $1500-$2,500. The cost for a fireplace with a USEPA-certified fireplace insert also ranges from $2500 to $3500.

As reported to CARB, SJUAPCD has estimated that the cost effectiveness to replace non-certified units ranges from $8,680 to $12,060. GBUAPCD estimates that it is a cost savings to $5,240.

The cost effectiveness for the Sacramento District still needs to be evaluated.

| Pollutants | Cost-Effectiveness ($/ton) |
|---|---|
| PM | $5,240 - $12,060 |
| | |

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJUAPCD | Upon sell or transfer of real property each wood burning heater must be EPA Phase II certified, a pellet fueled wood burning heater, permanently rendered inoperable, or removed. | Six months from adoption | 1/1/04 |
| GBUAPCD – Town of Mammoth Lakes | Upon sell or transfer of a majority interest in any real property existing non-certified solid fuel appliances shall be replaced, removed, or rendered inoperable | Three months from adoption | 2/15/91 |
| City of Sebastopol | Remove or replace non-certified units when interior remodel or renovation requires a building permit, the work exceeds $3500, and the work is in the same room as the unit. | 31 days after adoption | 10/03 |
| | Effective June 1, 2005, it unlawful to use non-certified wood heaters within the City of Sebastopol except in the case of hardship. | June 1, 2005 | 6/1/05 |

| | | | |
|---|---|---|---|
| | Non-certified no longer allowed for hardship cases which are sole source of heat, a temporary source of heat, or an inadequate alternative source of heat. | June 1, 2007 | 6/1/07 |

Depending on the program, the full implementation time frames have ranged from 31 days to more than one year.

Public Acceptability
The public acceptability of this program is unknown. An incentive program would most likely be the most acceptable of the programs if a funding source is identified. There have only been two Districts that have implemented a replacement program so far, and the SJUAPCD program does not affect wood burning fireplaces. The City of Sebastopol has the most restrictive program in that after the specified date non-EPA certified devices are banned. The public acceptability of that type of program is unknown. There are other cities/counties in the Bay Area that have requirements for replacement on remodel.

Enforceability
This is a measure that could be either implemented by the District or by the cities/counties through their building inspections. The enforcement mechanism still needs to be developed between the District and the Cities and Counties.

Resources
Actual funding sources have not been identified yet. Using fees to fund this program needs to be evaluated.

In the Bay Area, incentive programs have been funded with PM10 mitigation fees from two new power plants and rebates from retailers. In the future, the BAAQMD is looking to develop a cooperative rebate program from public utilities, retailers, and manufacturers.

## Information Still Needed

The emission reduction potential and cost-effectiveness for the Sacramento District still needs to be evaluated. The number of homes sold each year which contained a non-certified wood burning appliance would need to be determined, as well as the number of wood stoves versus fireplaces. The average amount of firewood used per fireplace in the Sacramento District would also need to be determined.

## References:

1. California Air Resources Board, Staff Report Proposed List of Measures to Reduce Particulate Matter – PM10 and PM2.5 (Implementation of Senate Bill 656, Sher 2003) Release Date: October 18, 2004
2. CARB Emission Inventory Data, CCOS SIP Data and Documentation, Annual and Seasonal Average Planning Inventory Report, Version 2.12
3. Buying and EPA-Certified Woodstove, United States Environmental Protection Agency, February 1990.
4. Sacramento County Assessor
5. MLS Statistics, December 2004 – Sacramento County and the City of West Sacramento; Sacramento Association of Realtors
6. San Joaquin Valley Unified APCD, RULE 4901 WOOD BURNING FIREPLACES AND WOOD BURNING HEATERS; July 17, 2003

Wood Burning Fireplaces and Wood Burning Heaters

Restrict Number of Wood Burning Fireplaces Allowed in New Residential Developments; Control Wood Moisture Content; Prohibit Materials not Intended to be Burned in Fireplace/Heater

**Wood-Burning Fireplaces and Wood-Burning Heaters – Restrict Number of Wood Burning Fireplaces Allowed in New Residential Developments; Control Wood Moisture Content; Prohibit Materials not Intended to be Burned in Fireplace/Heater**

Evaluator: Ali Mohamad/Aleta Kennard

## Control Measure Description

This control measure would limit the number of wood-burning fireplaces and stoves that can be installed in new residential developments and nonresidential properties. This measure would also limit the number of additional units in existing properties. Similar control measures have been adopted in SJUAPCD, GBUAPCD for the Town of Mammoth Lakes, KERNAPCD, and PCAPCD for Squaw Valley. Each area has set different limitations to address the concerns in their area.

This measure would potentially include limiting the moisture content of wood burned to 20% or less, if it is advertised as "seasoned wood". Lowering the moisture content will reduce smoke and particulate matter. Wood moisture content limits for seasoned wood have been set in SJUAPCD, SLOAPCD, and YSAQMD.

The measure could also potentially include prohibiting burning materials, such as household garbage, not intended for use in fireplaces and heaters. Measures that prohibit types of materials burned in wood burning devices have been adopted in SJUAPCD, TEHAPCD, SHAAQMD, SLOAPCD, GLENAPCD, BUTAQMD, YSAQMD, and the City of Sebastopol.

## Targeted EIC Categories and Inventory

Below are the current PM10 and PM2.5 emissions for Sacramento County. The proposed control measure for limiting the number of units will only reduce growth in emissions, since it applies to new development.

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.649 | 0.126 | 1.389 | 1.337 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 3.012 | 0.576 | 7.168 | 6.901 |
| | Total | 3.661 | 0.702 | 8.557 | 8.238 |

*Summer Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.065 | 0.013 | 0.140 | 0.135 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 0.303 | 0.058 | 0.721 | 0.695 |
| | Total | 0.368 | 0.071 | 0.861 | 0.830 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 610-600-0230-0000 | WOOD COMB - WOOD STOVES | 0.357 | 0.069 | 0.764 | 0.736 |
| 610-602-0230-0000 | WOOD COMB - FIREPLACES | 1.657 | 0.317 | 3.943 | 3.796 |
| | Total | 2.014 | 0.386 | 4.707 | 4.532 |

## Emission Reductions

According to an article in California Builder Magazine, January/February 2005 issue, more than 22,000 housing units were permitted in Sacramento in the last three years. Only 15% of the production is multifamily (i.e., apartment and condominiums) units. In 2004, multifamily production was in the 3,000-unit range with most of that being rental units. The predicted permitted units in 2005 are expected to be more than 22,000 units with an outside possibility of reaching 24,000 units. According to local dealers, wood burning stoves are rarely installed in new homes. They are usually added after the purchase of the home. Wood burning fireplaces are also not common in multifamily dwellings. Additionally, about 50% of new home construction will have wood burning fireplaces and most of these fireplaces are not USEPA-certified.

To estimate the emission reductions you would need to know how many homes are built per acre in the Sacramento area and how many homes are built with wood burning appliances.

Burning seasoned wood reduces the emissions of particulate matter because it burns hotter and more completely. Actual emission reductions from burning wood with lower moisture content cannot be estimated since there is not sufficient information available on the emission factors for seasoned versus unseasoned wood and the number of households that currently burn unseasoned wood. In addition, the control measure does not limit the use of wood to seasoned only.

Prohibition on burning household garbage, which can include materials such as cardboard, plastic jugs, and particle board will lower particulate matter emissions and the emissions of toxic air contaminants. Emission reductions cannot be estimated for this control measure since Staff does not have information on the number of people that burn garbage in their wood burning appliances and also the amount of garbage burned in the District.

## Cost Effectiveness

As reported to CARB, SJUAPCD estimated the cost effectiveness for limiting the number of wood burning appliances to be $0 to $1,719 per ton. Also as reported to CARB, SJUAPCD estimated the cost effectiveness for controlling wood moisture content and prohibiting fuels that are not intended for wood burning appliances to be $0.

In their rulemaking document, SJUAPCD did not calculate cost-effectiveness for this measure. They state that these sources are not subject to the California Clean Air Requirement for cost-effectiveness because they are not sources subject to District permit requirements and BARCT rules. SJUAPCD did perform a socioeconomic analysis and found that major industry sectors that will have greatest impact are the firewood production industry and hearth product services sector. They found that on balance, under worst case scenarios that the net impacts of the rule amendments would be a modest employment decrease of 55 jobs in the valley.

| Pollutant | Cost-Effectiveness ($/ton) |
|---|---|
| PM | $0 - $1,719 |
| | |

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJUAPCD | No wood burning fireplaces in new residential development with density greater than 2 dwelling units per acre. No more than 2 EPA Phase II certified wood burning heaters per acre in new development with density of 3 dwelling units per acre. No more than 1 wood burning fireplace or wood burning heater per dwelling unit in any new development with density less than 3 dwelling | Six months from adoption | 1/1/04 |

| | | | |
|---|---|---|---|
| | units per acre. | | |
| | Wood moisture content of 20% or less for seasoned wood | Upon adoption | 7/17/03 |
| | Prohibited Fuel Types | Upon adoption | 7/17/03 |
| GBUAPCD – Town of Mammoth Lakes | No more than 1 solid fuel appliance in any dwelling or nonresidential property | Upon adoption | 12/7/90 |
| TEHAPCD | Prohibited fuel types | Upon adoption | 3/14/95 |
| SHAAQMD | Prohibited fuel types | Upon adoption | 3/1/94 |
| SLOAPCD | Wood moisture content of 20% or less for seasoned wood | Five months after adoption | 2/1/94 |
| | Prohibited Fuel Types | Upon adoption | 10/19/93 |
| GLENAPCD | Prohibited Fuel Types | Upon adoption | |
| BUTAQMD | Prohibited Fuel Types | Upon adoption | 10/25/01 |
| YSAQMD | Wood moisture content of 20% or less for seasoned wood | Upon adoption | 12/8/04 |
| | Prohibited Fuel Types | Upon adoption | 12/8/04 |
| City of Sebastopol | Prohibited Fuel Types | 31 days after adoption | 10/03 |
| KERNAPCD | No person shall install a wood burning fireplace in a new residential subdivision which will consist of 20 or more dwelling units. | One day after adoption | 7/9/04 |
| PCAPCD for Squaw Valley | Use of wood fired appliances (excludes fireplaces) shall be limited to one certified appliance per commercial or single family residential structure approved after 7/1/86. | Two weeks after adoption | 7/1/86 |
| | Wood fired appliances or fireplaces shall not be used in multiple unit residential developments approved after 7/1/86 | Two weeks after adoption | 7/1/86 |

Depending on the program, the implementation time frames have ranged from date of adoption to six months from date of adoption.

Public Acceptability

There are a number of districts and cities/counties that have adopted these types of programs. Many of these programs have been in place since the mid-1990's.

Enforceability
This measure could either be adopted and enforced through the District adopting a regulation or it could be adopted and enforced through cities adopting an ordinance. There may be potential efficiencies if compliance is incorporated into the building inspection and review processes.

Resources
Actual funding sources have not been identified yet. Using fees to fund this program needs to be evaluated.

## Information Still Needed

The emission reduction potential and cost-effectiveness for the Sacramento District still needs to be evaluated. Information that still needs to be determined is the number of homes built per acre in the Sacramento area, and the number of homes built with wood burning appliances, the percent reductions from using seasoned wood, the number of households that currently burn unseasoned wood, the number of people that burn garbage in their wood burning appliances, and the amount of garbage burned in the District.

## References:

1. California Air Resources Board, Staff Report Proposed List of Measures to Reduce Particulate Matter – PM10 and PM2.5 (Implementation of Senate Bill 656, Sher 2003) Release Date: October 18, 2004
2. California Air Resources Board, SIP Emissions Projections (CCOS Domain), July 22, 2004.
3. Background Model Wood Stove Ordinance, BAAQMD
4. Local dealers for stoves and fireplaces.
5. CBIA article "California Housing Boom to Continue", by CBIA Chief Economist Alan Nevin, California Builders Magazine, January/February 2005 Issue.
6. Buying and EPA-Certified Woodstove, United States Environmental Protection Agency, February 1990.
7. San Joaquin Valley Unified APCD, RULE 4901 WOOD BURNING FIREPLACES AND WOOD BURNING HEATERS; July 17, 2003

Combustion

Control for Chain-Driven Charboilers

## Control for Chain-Driven Charboilers

Evaluator: Aleta Kennard

### Control Measure Description

This measure focuses on the control of PM and VOC emissions from chain driven charbroilers. A charbroiler is a cooking device composed of a grated grill, a high-temperature radiant surface, and a heat source. Common types of charbroilers are grill charbroilers, flame broilers, and direct-fired barbecues. A chain-driven charbroiler is a semi-enclosed cooking device with a mechanical chain that is automatically moving food through the device. An under-fired charbroiler is a cooking device that has a grill, a high temperature radiant surface, and a heat source located below the food.

This proposed measure will focus on chain-driven charbroiler operations. Chain-driven charbroilers are the major source of uncontrolled ROG emissions from restaurant cooking. Recent studies by the Ventura County APCD indicate that 54% of all uncontrolled ROG emissions from restaurant operations are from chain-driven charbroilers, 38% from under-fired broilers, and 8% from deep fat fryers.

The use of a catalytic oxidizer, placed above the charbroiler in the stack and activated by heat from the cooking, appears to be the best and most cost-effective emission control device for chain-driven charbroilers. Other control devices, identified in a South Coast AQMD staff report for use in their regulations, include self-cleaning ceramic filters, fiber-bed filters, and thermal incineration.[7]

### Targeted EIC Categories and Inventory

### 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | NOx Emissions tpd | VOC Emissions tpd | PM10 Emissions Tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 690-680-6000 | Cooking – Commercial Charbroiling | 0 | 0.0493 | 0.4058 | 0.2435 |

[7] *Staff Report for Proposed Rule 1138 – Control of Emissions from Restaurant Operations,* SCAQMD, October 10, 1997

*Summer Emissions*

| CES/EIC Codes | Material Description | NOx Emissions tpd | VOC Emissions tpd | PM10 Emissions Tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 690-680-6000 | Cooking – Commercial Charbroiling | 0 | 0.0493 | 0.4058 | 0.2435 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | NOx Emissions tpd | VOC Emissions tpd | PM10 Emissions Tpd | PM2.5 Emissions tpd |
|---|---|---|---|---|---|
| 690-680-6000 | Cooking – Commercial Charbroiling | 0 | 0.0493 | 0.4058 | 0.2435 |

## Emission Reductions

Three California air districts have regulations to control emissions from commercial cooking operations – South Coast Rule 1138, adopted in 1997 primarily to control chain-driven charbroilers; and San Joaquin Valley Rule 4692, adopted in March 2002 and quite similar to the SCAQMD Rule. Ventura is the latest district to adopt a chain-driven charbroiler regulation. It was adopted in October 2004. With the adoption of South Coast Rule 1138 in late 1997, Ventura County initiated their study and a draft staff report was completed on July 2, 2003[8]. This staff report appears to have the most recent detailed information on reducing emissions from chain-driven charbroilers and is used extensively in this analysis.

South Coast AQMD Rule 1138 requires that conveyorized charbroilers install emission control devices that are certified to reduce both ROG and PM emissions by 83%. This reduction percentage is based on work conducted by the University of California at Riverside's Center for Environmental Research and Technology. The San Joaquin Valley APCD rule references SCAQMD's rule and requires certified control devices with the same efficiency as in the South Coast, i.e., 83%. Ventura also took this approach. Accordingly, it may be appropriate to assume that an 83% reduction of the uncontrolled VOC and PM emissions from chain-driven charbroilers would occur.

The commercial charbroiling inventory includes emissions from both chain-driven and under-fired charbroilers. In order to estimate the potential emission reductions from this category, the number of chain-driven versus under-fire charbroilers needs to be identified. This information is unavailable at this time.

Testing in the South Coast has shown that the majority of PM10 emissions from charbroilers are measured at 2.5 microns and below. This data would indicate that the PM2.5 inventory for this category is underestimated.

[8] Draft Staff Report, Rule 74.31, Restaurant Cooking Operations, and Rule 23, Exemptions from Permit. Ventura County APCD, July 2, 2003.

## Cost Effectiveness

Based on the Ventura Staff Report, a new NIECO conveyorized charbroiler equipped with a catalytic oxidizer has a cost premium of about $3700. Charbroilers can be retrofitted with catalysts for about the same price. Base on Ventura's Staff Report an average commercial charbroiler emits about 0.61 tons/year of PM10 and 0.16 tons/year of VOC. Ventura estimated the capital and annual costs for an average charbroiler to be:

| One-Time Costs | |
|---|---|
| Catalytic Oxidizer | $3700 |
| Installation Cost | $1000 |
| District Permit Processing | $ 957.50 |
| Subtotal | $5,657.50 |
| Assume one catalyst replacement | $4289.31 |
| TOTAL | $9,946.81 |

| Annual Costs | |
|---|---|
| O&M for catalyst | $500 |
| Exhaust Stack Cleaning (savings) | -$750 |
| District Permit Renewal | $357.50 |
| Subtotal | $107.50 |

In calculating their cost effectiveness, they used the following assumptions:

Assumptions:
1. Equipment life 10 years
2. One catalyst replacement
3. Capital Recovery Factors
   10 years @ 8 percent = 0.149
   5 years @ 8 percent = 0.2505

$$\text{ROC Cost Effectiveness} = \frac{(0.149)(5{,}657.50) + (0.2505)(4289.31) + 107.50}{(0.83)(0.16)} = 14{,}924/\text{ton}$$

$$\text{VOC+PM10 Cost Effectiveness} = \frac{(0.149)(5{,}657.50) + (0.2505)(4289.31) + 107.50}{(0.83)(0.77)} = 3{,}148/\text{ton}$$

| Pollutant | Cost-Effectiveness ($/ton) |
|---|---|
| VOC | $14,924 |
| | |
| VOC+PM | $3,148 |
| | |

These calculations do not take into account fuel savings. There is evidence that catalytic oxidizers reduce charbroiler fuel costs by adding heat to the cooking process. With this savings, SCAQMD staff believes that a catalyst can pay for itself in less than two years. There also may be cost savings from less maintenance for stack cleaning.

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SCAQMD | Certified control devices to reduce VOC and PM by 83% | Two years from adoption | 11/14/99 |
| SJUAPCD | Certified control devices to reduce VOC and PM by 83% | One year from adoption | 3/21/03 |
| VCAPCD | Certified control devices to reduce VOC and PM by 83% | One year from adoption | 10/12/05 |

Implementation time frames for this measure have ranged from one to two years from adoption.

Public Acceptability
This control measure has been implemented in two districts and is being implemented in a third district.

Enforceability
The District has authority to adopt and enforce the rule.

Resources
Actual funding sources have not been identified yet. In the other district's, permits were required for the equipment to help recover the cost for implementing the measure.

## Information Still Needed

The emission reduction potential and cost effectiveness for the Sacramento District still needs to be evaluated. The number of chain-driven versus over-fire charbroilers needs to be identified in order to estimate the potential emission reduction. The PM10 versus PM2.5 emission inventory needs to be evaluated based on SCAQMD test results that may indicate that most of the PM10 emissions are PM2.5. The cost of the catalytic oxidizer and the installation of the equipment need to be verified for the Sacramento area. The stack cleaning cost savings and potential fuel saving costs also need to be examined. If permits will be required for this equipment, the permitting and testing costs need to be determined.

## References:

1. SJVUAPCD Rule 4692 Commercial Charbroiling, adopted March 21, 2002

2. CARB Emission Inventory Data, CCOS SIP Data and Documentation, Annual and Seasonal Average Planning Inventory Report, Version 2.12

3. VCAPCD Rule 74.25 Restaurant Cooking Operations, adopted October, 12 2004

4. VCAPCD Final Staff Report for Rule 74.25, dated August 31, 2004

5. SCAQMD 2003 AQMP, Final Appendix IV-A, Stationary Source Control Measure, Emission Reductions from Restaurant Operations

Fugitive Dust

Limit PM emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, such as land clearing, grubbing and scraping. Also limits PM from inactive disturbed land and from track-out resulting from construction and demolition operations.

**Limit PM emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, such as land clearing, grubbing and scraping. Also limits PM from inactive disturbed land and from track-out resulting from construction and demolition operations**

Evaluator: Kevin J. Williams

## Control Measure Description

This control measure limits emissions of PM from construction, demolition, excavation, extraction, grading, and other earthmoving activities, such as land clearing, grubbing, and scraping. The control measure also limits PM emissions from inactive disturbed land due to vehicle travel and wind blown dust, and from track-out resulting from construction and demolition operations. The requirements are based on San Joaquin Valley APCD Rules 8021 and 8041 and South Coast AQMD Rule 403 and 403.1. There other districts that have adopted various controls for fugitive dust from these types of sources such as PCAPCD, MDAQMD, IMPCAPCD, AVAQMD, KCAPCD, and ACAPCD. Potential control requirements include the following:

Demolition (SJVAPCD 8021)

- Apply sufficient water to building exterior surfaces, unpaved surface areas where equipment will operate, and razed building materials to limit visible dust emissions (VDE) to 20% opacity;
- Apply sufficient dust suppressants to unpaved surface areas within 100 feet where materials from razing or demolition will fall in order to limit VDE to 20% opacity;
- Apply sufficient dust suppressants to unpaved surface areas where wrecking or hauling equipment will be operated in order to limit VDE to 20% opacity;
- Apply water within 1 hour of demolition to unpaved surfaces within 100 feet of the demolished structure; and
- Apply various control measures to bulk materials that result from demolition, such as: water; chemical suppressants; wind barriers; and tarp covers for piles and truck loads.

Activity prior to construction and earthmoving activities (SJVAPCD 8021)

- Pre-water the site to limit VDE to 20% opacity; and
- Phase work to reduce the amount of disturbed surface area at any one time.

During active construction and earthmoving operations (SJVAPCD 8021)

- Apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20% opacity; or

- Construct and maintain wind barriers sufficient to limit VDE to 20% opacity, in conjunction with the application of water or chemical/organic stabilizers/suppressants.
- Apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20% opacity and meet the conditions of a stabilized unpaved road surface.

Temporary stabilization during periods of inactivity (SJVAPCD 8021)

- Restrict vehicular access to the area; and
- Apply water or chemical/organic stabilizers/suppressants, sufficient to comply with the conditions of a stabilized surface. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions of a stabilized surface area.

Speed controls (SJVAPCD 8021)
Limit the speed of vehicles traveling on unpaved access/haul roads within construction sites to 15 mph, and post speed limit signs at least every 500 feet.

Wind generated dust (SJVAPCD 8021)
Cease outdoor construction and earthmoving activities that disturb soil whenever VDE exceeds 20% opacity, but continue operation of water trucks and devices unless it is unsafe to do so.

Track-Out (SJVAPCD 8041)

- Remove all visible carry-out and track-out at the end of each workday.
- Immediately remove carry-out and track-out when it extends 50 feet or more beyond the site exit point.
- Cleanup of carry-out and track-out shall be accomplished by: manual sweeping or pick-up; rotary broom or brush accompanied by sufficient wetting; PM10-efficient street sweeper; or flushing with water where curbs and gutters are not present and it will not have an adverse impact on storm water drainage systems.
- Use track-out control devices to remove dirt and mud from tires at site exit points.

Emissions beyond property line (SCAQMD 403)
Dust shall not remain visible in the atmosphere beyond the property line of the emissions-generating activity.

PM10 emission limits (SCAQMD 403)
The difference between upwind and downwind concentrations of PM10, measured simultaneously, shall not exceed 50 micrograms per cubic meter.

Dust Control Plan (SJVAPCD 8021)
An owner/operator must submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential development; or 5 acres or more of disturbed surface area for non-residential development; or will include moving, depositing, or relocating more than 2,500 cubic yards of bulk material on at least 3 days.

Implementation of BACM (SCAQMD 403)
Implement Best Available Control Measures (BACM) as specified in Table 1 of SCAQMD Rule 403 to limit dust emissions from the following activities: backfilling; clearing and grubbing; clearing forms; crushing; cut and fill; demolition; disturbed soil; earthmoving; importing/exporting of bulk materials; landscaping; road shoulder maintenance; screening; staging areas; and stockpiles.

Additional requirements for large operations (SCAQMD 403)
Large operations are defined as active operations on property which contains 50 or more acres of disturbed surface area; or any earthmoving operation with a daily throughput volume of 5,000 cubic yards or more for 3 days during the most recent 365-day period. Additional requirements for large operations include:

- Submit a Large Operation Notification to the APCO within 7 days of qualifying as a large operation;
- Maintain daily records to document the specific dust control actions taken;
- Identify a dust control supervisor who is on-site or available on-site within 30 minutes during working hours;
- Implement dust control measures for large operations as specified in Table 2 of SCAQMD Rule 403 to limit dust emissions from the following activities: earthmoving, disturbed surface areas, unpaved roads, open storage piles; and
- When applicable emission limitations are not being met, implement contingency control measures as specified in Table 3 of SCAQMD Rule 403.

## Targeted EIC Categories and Inventory

There is only a PM10 and PM2.5 inventory for these control measures. There are not any emissions from combustion sources included in these inventory categories.

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 630-622-5400-0000 | Building Construction Dust, Residential | 2.1747 | 0.4520 |
| 630-624-5400-0000 | Building Construction Dust, Commercial | 1.2237 | 0.2544 |
| 630-626-5400-0000 | Building Construction Dust, Industrial | 0.3234 | 0.0672 |
| 630-628-5400-0000 | Building Construction Dust, Institutional | 0.3833 | 0.0797 |
| 630-634-5400-0000 | Road Construction Dust | 2.6886 | 0.5588 |
| | Total | 6.7937 | 1.4121 |

*Summer Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 630-622-5400-0000 | Building Construction Dust, Residential | 2.5721 | 0.5346 |
| 630-624-5400-0000 | Building Construction Dust, Commercial | 1.4473 | 0.3008 |
| 630-626-5400-0000 | Building Construction Dust, Industrial | 0.3824 | 0.0795 |
| 630-628-5400-0000 | Building Construction Dust, Institutional | 0.4533 | 0.0942 |
| 630-634-5400-0000 | Road Construction Dust | 3.1798 | 0.6609 |
| | Total | 8.0349 | 1.6700 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 630-622-5400-0000 | Building Construction Dust, Residential | 2.3736 | 0.4934 |
| 630-624-5400-0000 | Building Construction Dust, Commercial | 1.3356 | 0.2776 |
| 630-626-5400-0000 | Building Construction Dust, Industrial | 0.3529 | 0.0734 |
| 630-628-5400-0000 | Building Construction Dust, Institutional | 0.4184 | 0.0870 |
| 630-634-5400-0000 | Road Construction Dust | 2.9345 | 0.6099 |
| | Total | 7.4150 | 1.5413 |

## Emission Reductions

The report entitled "Improvement of Specific Emission Factors (BACM Project No. 1)," (MRI, 1996), is the basis for the uncontrolled emission factors used by ARB to estimate emissions from this category. Staff analysis of the MRI data indicates that approximately 56% of the emissions is this category are due to earthmoving/demolition operations and 44% are due to vehicle travel over unpaved surface areas.

The SJVAPCD staff report for amendments to fugitive PM10 rules estimates the effectiveness of BACM measures. Based on the information in this report, the composite efficiency of controls to reduce PM10 emissions from earthmoving/demolition is estimated to be 60%, while the composite efficiency of controls to reduce PM10 emissions from vehicle travel over unpaved surface areas is estimated to be 75%. Weighting these control efficiencies by the percentages obtained from the MRI report gives an estimate of an overall control effectiveness for this category of 67%.

The emission reduction potential in Sacramento County still needs to be determined. The actual emissions due to earthmoving/demolition operations need to be estimated. Soil types and moisture content in the Sacramento area would need to be analyzed.

## Cost Effectiveness

Cost effectiveness values for measures applicable to earthmoving and demolition operations, as estimated by SCAQMD and SJVAPCD, range from $197 to $304 per ton. Cost effectiveness values for track-out control measures, as estimated by SJVAPCD, range from $792 to $322,000 per ton; however, it is likely that controls as applied to SMAQMD would more likely be in the range of $792 to $10,000 per ton. Overall, the cost effectiveness of this measure is estimated to range from $197 to $10,000 per ton.

| Pollutant | Cost-Effectiveness ($/ton) |
|---|---|
| PM10/PM2.5 | $197 - $10,000 |

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJVAPCD | **Demolition** – Limit VDE to 20% opacity by applying water to building exterior surfaces/unpaved surfaces/razed building materials; | 6 months after adoption | 5/15/2002 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | and dust suppressant to unpaved areas where razed materials fall. Prevent/remove carry-out/track-out. Apply control measures to bulk materials from demolition. | | |
| | **Demolition** – Limit VDE to 20% opacity by applying dust suppressant to unpaved areas within 100' of where razed materials will fall. Apply water within 1 hour of demolition to unpaved surfaces within 100' of demolished structure. | 40 days after adoption | 10/1/2004 |
| | **Prior to Construction and Earthmoving** – Pre-water the site to limit VDE to 20% opacity. Phase work to reduce the amount of disturbed surface area at any one time. | 6 months after adoption | 5/15/2002 |
| | **During Active Construction and Earthmoving** – Limit VDE to 20% opacity by: applying water/chemical suppressants to work areas/ unpaved haul/access roads/ unpaved vehicle/equipment traffic areas; and constructing/ maintaining wind barriers. | 6 months after adoption | 5/15/2002 |
| | **Periods of Inactivity** – Restrict vehicular access to the area. Stabilize surface area with water/ chemical suppressants. | 6 months after adoption | 5/15/2002 |
| | **Speed Controls** – Limit speed of vehicles on unpaved haul/access roads within construction sites to 15 mph and post speed limit signs every 500'. | 40 days after adoption | 10/1/2004 |
| | **Wind Generated Dust** – Cease outdoor construction/earthmoving activities, except water trucks, whenever VDE exceeds 20% opacity. | 40 days after adoption | 10/1/2004 |
| | **Dust Control Plan (>40 acres)** – Owner/operator must submit a DCP prior to start of project that includes 40 or > acres of disturbed surface area or the movement of more than 2,500 $yd^3$ of bulk material on at least three days. | 6 months after adoption | 5/15/2002 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **Dust Control Plan ( >10/5 acres)** – Owner/operator must submit a DCP prior to the start of any project that includes disturbed surface area of 10 or > acres for residential development or 5 or > acres for non-residential development; or the moving, depositing, or relocating of more than 2,500 $yd^3$ of bulk material on at least three days. | 40 days after adoption | 10/1/2004 |
| | **Track-Out** – Remove all visible carry-out/track-out at end of workday using approved method. Immediately remove carry-out/track-out when it extends 50' or > beyond the exit point using approved method. Use track-out control devices to remove dirt/mud from tires at exit points. | 6 months after adoption | 5/15/2002 |
| SCAQMD | **Emissions Beyond Property Line** – Dust shall not remain visible beyond the property line. | Upon adoption | 7/9/1993 |
| | **PM10 Emission Limit** – The difference between upwind/ downwind concentrations of PM10, measured simultaneously, shall not exceed 50 $ug/m^3$. | Upon adoption | 7/9/1993 |
| | **Visible Emissions Limit** – Dust emissions that result from the movement of a motorized vehicle shall not exceed 20% opacity. | Upon adoption | 4/2/2004 |
| | **Implementation of BACM** – Owner/operator must implement BACM in Table 1 of Rule 403 for the following activities: backfilling/ clearing and grubbing/clearing forms/crushing/cut and fill/ demolition/disturbed soil/ earthmoving/importing/exporting of bulk materials/landscaping/road shoulder maintenance/screening/ staging areas/stockpiles. | Upon adoption | 2/14/1997 |
| | **Track-Out Removal** – Track-out shall not extend 25' or > from the point of origin, and all track-out shall be removed at the conclusion of workday or evening shift. | Upon adoption | 4/2/2004 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **Track-Out Controls** – For operations with disturbed surface area or 5 acres or >, or with a daily import or export of 100 $yd^3$ or > of bulk material, owner/operator shall use at least one of the following at each vehicle egress from the site to a paved road: install a pad of washed gravel at least 30' wide and 50' long; pave a surface area at least 100' long and 20' wide; use a wheel shaker/wheel spreading device at least 24' long and 10' wide to remove bulk materials from tires and undercarriages; or any other equivalent method, subject to APCO and EPA approval. | 8 months from the date of adoption | 1/1/2005 |
| | **Additional Requirements for Large Operations** – Large operations, involving 50 or > acres of disturbed land; or earthmoving with a daily volume of 5,000 $yd^3$ or > for 3 days a year, must: submit a Large Operation Notification within 7 days of qualifying as a large operation; maintain daily records to document actions taken; have a dust control supervisor on-site or available within 30 minutes during working hours; implement dust control measures for large operations in Table 2 of Rule 403; and if applicable emission limitations are nor being met, implement contingency measures in Table 3 of Rule 403. | 60 days from the date of adoption | 6/2/2004 |
| ICAPCD | **Track-Out** – Owners/operators must use one or more of the following to control track-out/carry-out: within 48 hours, rapidly clean up bulk material from paved road surface; install track-out prevent device at access points where unpaved traffic surfaces adjoin paved roads; or pave/chemically stabilize/cover with gravel 50' or > at access points where unpaved roads adjoin paved roads. | 90 days after adoption | 2/25/1997 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **Unpaved Haul/Access Roads** – Unpaved haul/access road over ½ mile in length, apply one or more of the following methods to at least 15% of the total road surface: pave; physical/chemical stabilization; apply gravel; apply water at least once per day; close the road permanently; reduce vehicle speed by 50% or reduce vehicle trips by 50%. | 90 days after adoption | 2/25/1997 |
| | **Haul Trucks** – For haul trucks, apply the following control methods: cover or enclose all haul truck loads; there shall be no holes or other openings in the cargo compartment that would allow spillage from the floor, sides, or tailgate; clean and/or wash the cargo compartment at the site after delivery of bulk material. | 90 days after adoption | 2/25/1997 |
| | **Bulk Material Handling** – Apply one or more of the following control methods when handling or storing bulk materials: spray with water at transfer points 15 minutes prior to handling; chemically or physically stabilize material; or protect from wind erosion by sheltering or enclosing the operation and transfer line. | 90 days after adoption | 2/25/1997 |
| AVAQMD | **Emissions Beyond Property Line** – Dust shall not remain visible beyond the property line. | Upon adoption | 7/9/1993 |
| | **PM10 Emission Limit** – The difference between upwind and downwind concentrations of PM10, measured simultaneously, shall not exceed 50 ug/$m^3$. | Upon adoption | 7/9/1993 |
| | **Implementation of BACM** – Within the South Coast Air Basin only, owners/operators must implement BACM as specified in the most recent Rule 403 Implementation Handbook. Outside the South Coast Basin, owners/operators may implement RACM in lieu of BACM. | Upon adoption | 2/14/1997 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **Track-Out** – Within the South Coast Air Basin only, owners/operators must prevent or remove track-out within 1 hour; or remove track-out when it extends more than 50' onto a paved public road; and pave/stabilize/install track-out control devices at egress points. | Upon adoption | 2/14/1997 |
| | **Additional Requirements for Large Operations** – Large operations, involving > 100 acres of disturbed land; or earthmoving with a daily volume of 7,700 $yd^3$ or > for 3 days in a year, must: submit a Large Operation Notification within 7 days of qualifying as a large operation; maintain daily records to document actions taken; and implement dust control measures for large operations in Tables 1 and 2 of Rule 403. As an alternative, a large operation may obtain an approved dust emissions control plan. Medium operations, involving between 50 and 100 acres of disturbed land; or earthmoving with a daily volume between 5,000 and 7,700 $yd^3$ or > for 3 days a year, are subject to the same requirements as large operations if a contingency notification has been issued. | Upon adoption | 2/14/1997 |
| KCAPCD | **Emissions Beyond Property Line** – Dust shall not remain visible beyond the property line. | Upon adoption | 9/7/1995 |
| | **Implementation of RACM** – Owners/operators must implement RACM for bulk material storage/ earthmoving/construction/demolition/ man-made conditions resulting in wind erosion. RACM includes use of wind breaks/wind screens, enclosures around storage piles, application of dust suppressants, surface compaction, gravel cover, vegetation, and control of vehicle speed. | Upon adoption | 9/7/1995 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **PM10 Emission Limit** – For large operations (> 100 acres disturbed surface/earthmoving exceeding a daily volume of 7,700 $yd^3$ > than 3 times a year), the difference between upwind/downwind concentrations of PM10, measured simultaneously, shall not exceed 50 $ug/m^3$. | Upon adoption | 9/7/1995 |
| | **Special Requirements for Large Operations** – For large operations (> 100 acres of disturbed surface/ earthmoving exceeding a daily volume of 7,700 $yd^3$ > than 3 times a year), the owner/operator must either conduct on-site PM10 monitoring or obtain an approved fugitive emissions dust control plan. | 4 months after adoption | 3/8/2005 |
| ACAPCD | **Good Housekeeping/Work Practices** – Fugitive dust emissions limited to 20% opacity by employing good housekeeping/work practices, including but not limited to: application of water and/or approved chemicals during demolition, construction, solid waste disposal, grading, and clearing of land; applying asphalt, water, and/or approved chemicals to unpaved roads, stockpiles and other surfaces that may generate fugitive dust; paving or repaving roads; maintaining roadways in a clean condition by washing or sweeping promptly; covering or wetting stockpiles or loads in trucks; installing paved entry aprons; installing vegetation, barriers or windbreaks; and maintaining reasonable vehicle speeds. | Upon adoption | 5/16/2000 |
| PCAPCD | **Emissions Beyond Property Line** – Dust shall not remain visible beyond the property line. | Upon adoption | 10/19/1993 |
| | **Opacity Limit** – Visible emissions of fugitive dust shall not exceed 40% opacity (No. 2 on the Ringelmann chart). | Upon adoption | 10/19/1993 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **PM10 Emission Limit** – The difference between upwind/ downwind concentrations of PM10, measured simultaneously, shall not exceed 50 ug/$m^3$. | Upon adoption | 10/19/1993 |
| | **Track-Out** – Track-out shall be minimized by the use of track-out/ erosion control, minimization, and preventative measures, and removed within 1 hour when it extends more than 50' onto a paved public road. All track-out shall be removed at the end of workday or every 24 hours for continuous operations, using wet sweeping or a vacuum device with a HEPA filter. Any track-out material shall be prevented from entering waterways or storm water inlets. | Upon adoption | 4/10/2003 |
| | **Unpaved Areas** – Unpaved areas subject to vehicle traffic must be stabilized by wetting, applying chemical suppressant, or covering. | Upon adoption | 4/10/2003 |
| | **Speed Control** – Vehicle speed on unpaved areas is limited to 15 mph unless the road surface and surrounding area is sufficiently stabilized to keep visible emissions within applicable limits for vehicles traveling more than 15 mph. | Upon adoption | 4/10/2003 |
| | **Storage Piles and Disturbed Areas** – Storage piles and disturbed areas not subject to vehicle traffic must be stabilized with water or chemical suppressant, or covered. | Upon adoption | 4/10/2003 |
| | **Prior to Ground Disturbance** – Prior to ground disturbance, including grading/excavating/ land clearing, sufficient water must be applied to prevent VE from exceeding applicable limits. | Upon adoption | 4/10/2003 |
| | **Suspend Operation in High Wind** – When wind speeds are high enough to result in VE crossing the boundary line, despite dust mitigation measures, grading/ earthmoving operations shall be suspended. | Upon adoption | 4/10/2003 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | **Haul Trucks** – Haul trucks must be maintained such that no spillage occurs from holes or other openings in the cargo compartments. Loads must be covered with tarps; or wetted and loaded with 6" of freeboard. | Upon adoption | 4/10/2003 |
| | **Inactive Disturbed Areas** – A person shall take such action(s), such as surface stabilization/ establishment of vegetative cover/ paving to minimize wind-driven dust from inactive disturbed surface areas. | Upon adoption | 4/10/2003 |
| MDAQMD | **Construction and Demolition** – Within the San Bernardino County portion of the Searles Valley planning area, the owner/operator of a construction/demolition operation shall prepare and follow a District-approved DCP that contains the following elements: provisions to maintain the natural topography to the extent possible during grading/ earthmoving activities; a construction schedule that specifies construction of parking lots/paved roads first, and upwind structures before downwind structures; provisions to cover/contain bulk material in haul trucks operating on paved roads; and provisions to remove track-out on paved road surfaces. | Upon adoption | 7/31/1995 |
| | **Construction and Demolition** – Within the Mohave Desert Planning area, the owner/operator of a construction/demolition operation shall: use periodic watering for short-term stabilization of a disturbed surface area; prevent track-out onto paved surfaces; cover loaded haul trucks when operating on publicly maintained paved surfaces; stabilize graded surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more | 5 months after adoption | 12/31/1996 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| | than 30 days; cleanup track-out or spills on publicly maintained paved surfaces within 24 hours; and reduce non-essential earthmoving activity under high wind conditions. | | |
| | **Construction and Demolition (Large Operations)** – Within the Mohave Desert Planning area, the owner/operator of a construction or demolition operation that disturbs 100 acres or > shall: prepare and submit to the District, prior to commencing any earthmoving activity, a DCP; provide stabilized access routes to the project site as soon as is feasible; maintain the natural topography to the extent possible; construct parking lots and paved roads first, where feasible; and construct upwind portions of a project first, where feasible. | 5 months after adoption | 12/31/1996 |

Public Acceptability
These measures have been implemented in a number of other districts in a variety of ways. The public acceptability here is unknown.

Enforceability
The District has authority to adopt and enforce the rule.

Resources
Additional District resources may be necessary to review/approve dust control plans and to inspect sites for compliance. Actual funding sources have not been identified yet.

## Information Still Needed

The emission reduction potential and cost effectiveness for the Sacramento District still needs to be evaluated.

## References:

1. Improvement of Specific Emission Factors (BACM Project No. 1), Final Report, Midwest Research Institute (MRI), March 29, 1996.

2. Final Staff Report, Proposed Amendments to Rule 403, Rule 1186, and Rule 403.1, South Coast AQMD, April 2, 2004.

3. Revised Final Staff Report for Proposed Amendments to Rule 403 and Rule 1186, South Coast AQMD, February 14, 1997.

4. Final Draft Staff Report, BACM Amendments to Regulation VIII (Fugitive PM10 Prohibitions), San Joaquin Valley APCD, May 20, 2004.

# Fugitive Dust

## Limit PM Emissions from Vehicle Travel on Unpaved Roads

## Limit PM Emissions from Vehicle Travel on Unpaved Roads

Evaluator: Kevin J. Williams, SMAQMD

### Control Measure Description

This control measure limits emissions of PM from vehicle travel on unpaved roads. The measure would apply to all new or modified public and private roads. The requirements are based on San Joaquin Valley APCD Rule 8061 and South Coast AQMD Rule 1186. Potential control requirements include the following:

Existing Unpaved Roads (SJVAPCD 8061)

- If the Annual Average Daily Vehicle Trips (AADT) is 26 or more, then the owner/operator shall limit visible dust emissions (VDE) to 20% opacity and the road shall meet the requirements of a stabilized surface through the use of: watering; uniform layer of washed gravel; dust stabilizers/suppressants; roadmix; paving; or equivalent method that can meet the conditions of a stabilized unpaved surface.
- As an alternative to the above, implement an APCO-approved Fugitive PM10 Management Plan that achieves at least 50% control efficiency.
- Five years from the date of rule adoption, each city, county, or state agency with primary responsibility for existing unpaved roads shall pave an average of 20% annually of all unpaved roads in urban areas up to a maximum of 5 cumulative miles within any one urban area, with priority given to roads with the highest AADT.

Existing Unpaved Roads (SCAQMD 1186)

Any owner/operator shall annually treat unpaved roads that have greater than the average AADT of all unpaved roads in its jurisdiction beginning one year from the date of rule adoption and each of the 8 calendar years after by either:

- Paving at least 1 mile of such roads; or
- Applying chemical stabilization to 2 miles of such roads in sufficient quantities to maintain a stabilized surface; or
- Installing signage at ¼ mile intervals that limits vehicle speeds to 15 mph on 3 miles of such roads; or
- Installing speed bumps every 500 feet on 3 miles of such roads; or
- Maintaining the roadway in such a manner that inhibits vehicle speeds in excess of 15 mph on 3 miles of such roads.

Prohibition on New Unpaved Roads in Urban Areas (SJVAPCD 8061)

The construction of any new unpaved road in an urban area is prohibited unless it meets the definition of a temporary unpaved road.

## Targeted EIC Categories and Inventory

There is only a PM10 and PM2.5 inventory for these control measures. There are not any emissions from combustion sources included in these inventory categories.

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 645-638-5400-0000 | Unpaved Road Travel Dust, City and County Roads | 2.9998 | 0.636 |
| 645-644-5400-0000 | Unpaved Road Travel Dust, BLM Roads | 0.0235 | 0.005 |
| 645-646-5400-0000 | Unpaved Road Travel Dust, Farm Roads | 0.3287 | 0.0697 |
| | Total | 3.352 | 0.7107 |

*Summer Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 645-638-5400-0000 | Unpaved Road Travel Dust, City and County Roads | 11.2402 | 2.3831 |
| 645-644-5400-0000 | Unpaved Road Travel Dust, BLM Roads | 0.0882 | 0.0187 |
| 645-646-5400-0000 | Unpaved Road Travel Dust, Farm Roads | 0.2078 | 0.0441 |
| | Total | 11.5362 | 2.4459 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 645-638-5400-0000 | Unpaved Road Travel Dust, City and County Roads | 7.1186 | 1.5092 |
| 645-644-5400-0000 | Unpaved Road Travel Dust, BLM Roads | 0.0559 | 0.0118 |
| 645-646-5400-0000 | Unpaved Road Travel Dust, Farm Roads | 0.2683 | 0.0569 |
| | Total | 7.4428 | 1.5779 |

## Emission Reductions

The 1997 staff report for SCAQMD Rule 1186 estimated the reduction in emissions from unpaved roads as 33%. Because of the thresholds for vehicle trips, this measure is expected to have very low applicability to Bureau of Land Management (BLM) or farm roads.

## Cost Effectiveness

SJVAPCD estimated cost effectiveness for dust suppression techniques (excluding paving) in the 2001 staff report for Rule 8061 to range from $56 to $1,481 per ton, while the cost effectiveness for paving was estimated to range from $2,160 to $5,920 per ton. SCAMQD estimated an overall cost effectiveness for unpaved road control techniques in the 1997 staff report for Rule 1186 of $958 per ton.

For the purposes of this measure, the cost effectiveness is expected to range from $56 to $5,920 per ton.

| Pollutant | Cost-Effectiveness ($/ton) |
|---|---|
| PM10/PM2.5 | $56 - $5,920 |
| | |

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJVAPCD | Limit VDE to 20% opacity on existing unpaved roads or implement an approved Dust Management Plan. | 6 months after adoption | 5/15/2002 |
| | Each city, county, or state agency with primary responsibility for existing unpaved roads shall pave an average of 20% annually. | Beginning 3 months after adoption and continuing for 5 years | 1/1/2005 – 1/1/2010 |
| | Prohibit new unpaved roads in urban areas unless they are temporary. | 40 days after adoption | 10/1/2004 |

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SCAQMD | Any owner/operator shall treat unpaved roads having greater than the average vehicle daily trips of all unpaved roads in its jurisdiction by: paving at least 1 mile annually; or stabilizing at least 2 miles annually; or limiting the speed on 3 miles annually to 15 mph using speed bumps, signage, or other maintenance techniques. | Beginning 1 year after adoption and continuing for 8 years | 1/1/1998 – 1/1/2006 |
| AVAPCD | Any owner/operator shall treat unpaved roads having greater than the average vehicle daily trips of all unpaved roads in its jurisdiction by: paving at least 1 mile annually; or stabilizing at least 2 miles annually; or limiting the speed on 3 miles annually to 15 mph using speed bumps, signage, or other maintenance techniques. | Beginning 1 year after adoption and continuing for 8 years | 1/1/1998 – 1/1/2006 |
| MDAQMD | For Searles Dry Lake, treat a minimum of 12 miles of heavily traveled industrial unpaved roads by weekly watering sufficient to maintain a silt loading of 0.58 ounces per square yard or less. Treat a minimum of 8 miles of heavily traveled industrial unpaved roads by weekly watering sufficient to maintain a silt loading of 0.17 ounces per square yard or less. | Upon adoption | 7/31/1995 |
| | Cities, towns, and the County of San Bernardino shall collectively stabilize sufficient publicly maintained, heavily traveled unpaved roads to reduce PM10 emissions by 1,541 tons per year. | 17 months after adoption | 12/31/1997 |
| ICAPCD | For any unpaved road more than 0.75 miles in length and with 20 or more vehicle miles per day, pave or stabilize 15% of the road surface. | 90 days after adoption | 2/25/1997 |

Implementation times frames range up to 8 years for full implementation.

Public Acceptability

These measures have been implemented in a number of other districts in a variety of ways. The public acceptability here is unknown.

Enforceability
The District has authority to adopt and enforce the rule.

Resources
Additional District resources may be necessary to inspect sites for compliance. Actual funding sources have not been identified yet.

**Information Still Needed**

The emission reduction potential and cost effectiveness for the Sacramento District still needs to be evaluated. Data to evaluate the emission reduction potential still needs to be determined and cost data for the Sacramento area needs to be obtained.

**References:**

1. Final Staff Report, Proposed Amendments to Rule 403, Rule 1186, and Rule 403.1, South Coast AQMD, April 2, 2004.

2. Revised Final Staff Report for Proposed Amendments to Rule 403 and Rule 1186, South Coast AQMD, February 14, 1997.

3. Final Draft Staff Report, BACM Amendments to Regulation VIII (Fugitive PM10 Prohibitions), San Joaquin Valley APCD, May 20, 2004.

Fugitive Dust

Limit PM Emissions from Vehicle Travel on Paved Roads by Requiring Use of PM10-Efficient Street Sweepers by Governmental Agencies or Their Contractors

**CONTROL MEASURE NUMBER:**
Control Measure Title: Paved Road Dust: Street Sweeping
Evaluator: Kevin J. Williams, SMAQMD

## Control Measure Description

This control measure limits emissions of PM from vehicle travel on paved roads by requiring the use of PM10-efficient street sweepers by governmental agencies or their contractors. The requirements are based on San Joaquin Valley APCD Rule 8061 and South Coast AQMD Rule 1186. In addition, Antelope Valley AQMD has requirements for PM10-efficient street sweepers. Potential control requirements include the following:

New Purchases of Street Sweeping Equipment (SJVAPCD 8061)

- Effective one year from the date of rule adoption, all purchases of street sweeping equipment shall be only PM10-efficient street sweepers.
- Use of PM10-efficient street sweepers shall be prioritized for use on routine street sweeper routes with paved curbs which have been determined to have the greatest actual or potential for dirt and silt loadings.
- Each agency or contactor shall purchase at least one PM10-efficient street sweeper within 3 years of the date of rule adoption.
- Street sweeping routes with paved curbs that are covered by PM10-efficient street sweepers shall be swept at least once per month.

Alternative: Replacement of All Street Sweeping Equipment (SCAQMD 1186)
Effective on (specific date), only certified PM10-efficient street sweeping equipment shall be used.

Post –Event Cleanup (SJVAPCD 8061)

- Within 24 hours of discovery of an accumulation of mud or dirt of at least 1 inch over an area of at least 50 square feet, remove mud or dirt from travel lanes or restrict vehicles from traveling over mud and dirt until it can be removed.
- As soon as practicable, remove mud and dirt from paved shoulders.

Post-Event Cleanup (SCAQMD 1186)
Within 72 hours of notification of visible roadway accumulations, begin removal of material through street cleaning.

## Targeted EIC Categories and Inventory

There is only a PM10 and PM2.5 inventory for these control measures. There are not any emissions from combustion sources included in these inventory categories.

## 2004

*Winter Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 640-635-5400-0000 | Paved Road Travel Dust, Freeways | 3.5398 | 0.5977 |
| 640-637-5400-0000 | Paved Road Travel Dust, Major Streets | 5.4053 | 0.9127 |
| 640-639-5400-0000 | Paved Road Travel Dust, Collector Streets | 1.1109 | 0.1876 |
| 640-641-5400-0000 | Paved Road Travel Dust, Local Streets | 4.3577 | 0.7358 |
| | Total | 14.4137 | 2.4338 |

*Summer Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 640-635-5400-0000 | Paved Road Travel Dust, Freeways | 3.714 | 0.6271 |
| 640-637-5400-0000 | Paved Road Travel Dust, Major Streets | 5.6712 | 0.9576 |
| 640-639-5400-0000 | Paved Road Travel Dust, Collector Streets | 1.1656 | 0.1968 |
| 640-641-5400-0000 | Paved Road Travel Dust, Local Streets | 4.5721 | 0.772 |
| | Total | 15.1229 | 2.5535 |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | PM10 Emissions tpd | PM2.5 Emissions tpd |
|---|---|---|---|
| 640-635-5400-0000 | Paved Road Travel Dust, Freeways | 3.6284 | 0.6127 |
| 640-637-5400-0000 | Paved Road Travel Dust, Major Streets | 5.5405 | 0.9355 |
| 640-639-5400-0000 | Paved Road Travel Dust, Collector Streets | 1.1387 | 0.1923 |
| 640-641-5400-0000 | Paved Road Travel Dust, Local Streets | 4.4667 | 0.7542 |
| | Total | 14.7743 | 2.4947 |

## Emission Reductions

The 1997 SCAQMD staff report for Rule 1186 estimated the overall emission reduction for street sweeping requirements at 7% for PM10-efficient equipment and 7% for post-event cleanup. In the 2003 PM10 Plan, SJVAPCD estimated emission reductions of about 10% of the inventory for collector and local streets.

## Cost Effectiveness

In the 1997 staff report for Rule 1186, SCAQMD estimated the cost effectiveness of PM10-efficient street sweepers to be $1,119 per ton, and the cost effectiveness of post-event clean-up to be <$100.

In the 2003 PM10 Plan, SJVAPCD estimated the cost effectiveness of the following requirements:

- Limit the purchase of new street sweepers to PM10-efficient: $33 per ton
- Require purchase of one PM10 efficient unit within 3 years: $792 per ton
- Require street to be swept by PM10-efficient unit once per month: $1,070 per ton
- Require post-event clean-up within 24 hours: $2,850.

For the purposes of this measure, the cost effectiveness is expected to range from $33 to $2,850 per ton.

| Pollutant | Cost-Effectiveness ($/ton) |
|---|---|
| PM10/PM2.5 | $33 - $2,850 |
| | |

## Implementation

Implementing districts and schedules

| District | Rule requirement | Implementation Timeframe | Implementation Date |
|---|---|---|---|
| SJVAPCD | All purchases of street sweeper equipment by city, county, or state agency with primary responsibility for existing paved roads within an urban area shall be PM10-efficient. | One year from adoption | 7/1/05 |
| | The use of PM10 efficient street sweepers shall be prioritized for use on routine routes with greatest actual or potential for dirt and silt loading. | Upon adoption | 8/19/04 |
| | Require to put in service at least one PM10-efficient street sweeper | Four years from adoption | 7/1/08 |

| | | | |
|---|---|---|---|
| | Routes with PM10-efficient street sweepers shall be swept at least monthly | Upon adoption | 8/19/04 |
| | Within 24 hours of discovery of mud or dirt at least 1" over an area of at least 50 $ft^2$, remove mud/dirt from travel lane or restrict traffic until it can be removed. ASAP remove from paved shoulders. | Upon adoption | 8/19/04 |
| SCAQMD | Only certified street sweeping equipment shall be acquired or used. | Unspecified | |
| | Within 72 hours of notification of visible roadway accumulations, begin removal of material through street cleaning. | Unspecified | |
| AVAQMD | Agency purchasing, leasing, or otherwise contracting for street sweeper equipment shall use PM10-efficient equipment | Two years from adoption | 1/1/99 |

Implementation for this measure has ranged to up to four years.

Public Acceptability
These measures have been implemented in three other districts. The public acceptability here is unknown.

Enforceability
The District has authority to adopt and enforce the rule. The enforcement mechanism still needs to be developed between the District and the Cities and Counties.

Resources
Additional District resources may be necessary to inspect sites for compliance. Actual funding sources have not been identified yet.

**Information Still Needed**

The emission reduction potential and cost-effectiveness for the Sacramento District still needs to be evaluated. Data to evaluate the emission reduction potential still needs to be determined and cost data for the Sacramento area needs to be obtained.

## References:

1. Final Staff Report, Proposed Amendments to Rule 403, Rule 1186, and Rule 403.1, South Coast AQMD, April 2, 2004.

2. Revised Final Staff Report for Proposed Amendments to Rule 403 and Rule 1186, South Coast AQMD, February 14, 1997.

3. Final Draft Staff Report, BACM Amendments to Regulation VIII (Fugitive PM10 Prohibitions), San Joaquin Valley APCD, May 20, 2004.

4. 2003 PM10 Plan, San Joaquin Valley APCD, revised December 18, 2003.

# Transportation

## On-Road Motor Vehicle Mitigation Option

**On-Road Motor Vehicle Mitigation Option**

Evaluator: C. McGhee

**Control Measure Description**

This measure would provide employers, who employ 250 or more employees, with a menu of options to reduce mobile source emissions generated from employee commutes. The requirements are based on SCAQMD Rule 2202.

**Targeted EIC Categories and Inventory**

**2004**

*Winter Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd |
|---|---|---|---|
| | Light duty passenger | 13.75 | 10.56 |
| | Light duty truck 1 | 5.61 | 4.70 |
| | Light duty truck 2 | 4.30 | 5.42 |
| | **Total** | **23.66** | **20.68** |

*Summer Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd |
|---|---|---|---|
| | Light duty passenger | 12.64 | 9.32 |
| | Light duty truck 1 | 5.05 | 4.12 |
| | Light duty truck 2 | 3.85 | 4.77 |
| | **Total** | **21.54** | **18.21** |

*Annual Average Emissions*

| CES/EIC Codes | Material Description | VOC Emissions tpd | NOx Emissions tpd |
|---|---|---|---|
| | Light duty passenger | 12.76 | 10.10 |
| | Light duty truck 1 | 5.16 | 4.48 |
| | Light duty truck 2 | 3.96 | 5.18 |
| | **Total** | **21.88** | **19.76** |

## Emission Reductions

Rule 2202 sets the South Coast District's Average Vehicle Ridership (AVR) to 1.52 for companies with 250 or more employees. The AVR represents the 25% above the region's 1992 baseline and accounts for additional trip reductions that should have resulted from all employers with 100 or more employees. The amendment to Rule 2202 in February 2004 updates the emission factors used to EMFAC 2002. This increases the worksite AVR, which causes an increase in the worksite's emission reduction targets, for calendar year 2004, by 17% and 42% for VOC and NOx respectively. South Coast estimates that the February 2004 amendment will achieve reductions of .47 tons/day of VOC and 1.06 tons/day of NOx.

Any emission results in the Sacramento area would vary as there is not an existing rule to measure against. In addition, further study is necessary to assess variables that are unique to the Sacramento area to determine the most reasonable AVR or emissions target.

## Cost Effectiveness

Cost-effectiveness is defined as the cost to comply with the new regulatory requirements, expressed in terms of dollars per ton of pollutant reduced. Cost can include equipment, materials, training, or any other costs associated with meeting new regulatory requirements. Employers have several compliance options within the rule and they are allowed the flexibility to modify or change their compliance plan at any time. South Coast estimates the cost effectiveness for this measure to be $8,000 - $10,000/ton.

## Implementation

With our own earlier research in this area and the Rule 2202 as a starting point, with further study this measure could prove advantageous to the area in the future. Implementation will necessitate significant modifications to the options available to employers that are more appropriate for the Sacramento area. Further study to be completed by the end of 2012, Board consideration will occur in spring of 2014 if adopted and implementation will be complete by summer 2015 assuming all other milestones are met. This time frame is necessary to facilitate a phased implementation to properly prepare, market, and notify any affected parties.

### Public Acceptability

This measure has only been implemented in the South Coast. The public acceptability here is unknown.

Enforceability
An enforcement program would need to be developed for this measure.

Resources
Additional District resources may be necessary to develop and ensure compliance with this measure. Actual funding sources have not been identified yet.

**Further information needs:**
The emission reduction potential and cost effectiveness for the Sacramento District still needs to be evaluated. Additional information that will likely be needed includes:

1. Employer information for Sacramento County
2. Determine baseline AVR or other method of measuring commute mode use.
3. Determine emissions reduced by the segment targeted to set a goal for further reduction.
4. Determine the political climate relative to a measure of this type. Previously not favorable.
5. Establish funding source to implement.

**References:**

1. SCAQMD Rule 2202 - On Road Motor Vehicle Mitigation Options
2. SCAQMD Final Staff Report for Proposed Amended Rule 2202 – On Road Motor Vehicle Mitigation Options
3. Final Socioeconomic Assessment For Proposed Amended Rule 2202 – On Road Motor Vehicle Mitigation Options

# APPENDIX D

# PUPLIC COMMENTS AND RESPONSES

**Public Workshop Comments (June 6, 2005)**

**Comment#1** Will any funding be passed down to those affected by the proposed control measures?

**Response** There is currently no funding available.

**Comment#2** Are credits going to be issued for reducing emissions, similar to the credits issued for not burning rice straw?

**Response** In general, mandatory emission reductions are not eligible for credits. Credits may be issued if particulate matter emissions are reduced voluntarily beyond the requirements of the control measures proposed under the SB656 program.

**Comment#3** It would be a big burden to agriculture to tell workers that there will be "no work today" because of high winds. The District should consider the negative impacts of the proposed tilling restrictions on the fragile farming industry. Farmers are also avoiding tilling on high wind days to reduce fire hazard.

**Response** The proposed measure to restrict agricultural tilling and mulching on high wind days was estimated to result in a minimal potential emission reduction of 0.078 tons per day of PM10. In addition, the potential reduction may have been overestimated because it did not take into account that farmers are already limiting such activity due to concern over fire hazard. For these reasons, Staff will exclude this measure from further consideration.

**Comment#4** There was more agricultural activity in our region in 1965, but the visibility was better. The pollution has steadily gotten worse as the number of people and vehicles has increased. No politician wants to limit growth, but the pollution problems are caused by people and their vehicles, not by farmers.

**Response** See response to comment #3. The emission inventory for Sacramento County indicates that motor vehicles and other mobile sources account for 75% of the combined emissions of ROG and NOx, which are precursors to secondary PM formation. However, the majority of PM emissions in our region come from other sources. Motor vehicles and other mobile sources account for only 8% of the direct PM10 emissions and 14% of the direct PM2.5 emissions. The District currently has a voluntary program which provides incentive monies to operators of old on-road and off-road heavy duty vehicles that elect to retrofit or replace their vehicles with cleaner burning engine technologies. The District, however,

does not have the authority to set emission standards for motor vehicles.

**Comment#5** Is the public going to be able to participate in the development of the proposed control measures?

**Response** The public will be invited to participate in the process as specific control measures are developed.

**Comment#6** What happens if the state finds that a control measure adopted by the district does not meet the state requirements for most stringent control measure?

**Response** SB656 does not contain requirements for establishing a "most stringent control measure" for controlling PM2.5 and PM10. SB 656 requires CARB, by January 1, 2009, to prepare a report on actions taken by CARB and local districts to comply with SB656. Other provisions in state law (California Health and Safety Code, Section 41504) provide that if CARB finds, after a public hearing, that the rules and regulations of a district will not likely achieve the state's ambient air quality standards, CARB may establish rules and regulations that it deems necessary for that district. However, given the review process district staff has undertaken and the involvement of CARB staff in that effort, additional action by CARB to override district decisions is unlikely.

**HPBA Pacific Comments (June 6, 2005)**

**Comment#1** Revise the staff report to clarify that USEPA does not certify pellet stoves as stated on Page 39 of the staff report. Pellet stoves are 87% cleaner than non-certified woodstoves.

**Response** Staff will revise the staff report.

**Comment#2** A density restriction on wood burning in new construction is unnecessary and unfair for homeowners. Simply requiring fireplaces to meet the EPA certified wood heater standard will achieve the desired reduction in density. As we have seen in other districts, the costs of the EPA certified appliances will mean that most builders will switch to gas or eliminate the fireplace altogether.

**Response** Staff has not yet made a final decision on the control options for reducing PM2.5 and PM10 emissions from wood burning appliances. Staff will be working with affected parties on the most suitable control options for our district during the development of this control strategy.

**Comment#3** We encourage the air district to look at the big picture when adopting its regulations. Biomass fuels are part of the long term energy solution. They are renewable and global warming neutral. Pellet stoves and EPA certified wood heaters are environmentally responsible and should be treated as such. It is noteworthy that pellet heaters are currently a part of the National energy bill before the US Senate, designed to reduce the nation's reliance on foreign oil.

**Response** Staff is proposing many options for reducing particulate matter emissions from wood burning. Staff has not yet made final determination on the list of control options to adopt for our district. Staff will evaluate the impact of each control option prior to adoption and will provide for public input during the development of this control measure.