FINAL 2007 AQMP
APPENDIX IV-A

DISTRICT'S STATIONARY AND MOBILE SOURCE CONTROL MEASURES

JUNE 2007

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SECTION 1

STATIONARY SOURCE CONTROL MEASURES

INTRODUCTION

This Appendix describes the South Coast Air Quality Management District (District) staff's proposed stationary and mobile source control measures to be included in the 2007 AQMP. Control measures presented in this appendix for PM2.5 are based upon a variety of market incentives and control strategies that are commercially available and/or technologically feasible in the next several years. This appendix also includes seven mobile source measures that the District is proposing to implement. CARB released its State and federal strategy for the California SIP in January 2007 (Appendix IV-B-I). District staff's recommended policy options to supplement CARB's control strategy are included in Appendix IV-B-II.

STATIONARY SOURCE CONTROL MEASURES

The Final 2007 AQMP includes 37 short-term control measures for stationary and mobile sources developed by the District staff that are expected to be implemented within the next several years. Stationary source measures contained in the 2007 AQMP include the remaining revised and partially implemented measures from the 2003 AQMP with 28 additional new control measures.

It should be noted that the emission reduction targets for the proposed control measures (those with quantified reductions) are established based on available or anticipated control methods or technologies. However, emission reductions associated with implementation of these and other control measures or rules in excess of the AQMP's projected reductions can be credited toward the overall emission reduction targets for the proposed control measures in this appendix.

Each of the Control Measures falls into one of seven strategies. These strategies and the corresponding Control Measure are presented in Table 1:

TABLE 1

List of District Staff's Control Measures Categorized by Control Strategy

Facility Modernization	
Number	**Title**
MCS-01	Facility Modernization [NOx, VOC, and PM2.5]
Energy Efficiency/Conservation	
Number	**Title**
MCS-02	Urban Heat Island [All Pollutants]
MCS-03	Energy Efficiency and Conservation [All Pollutants]

TABLE 1 (continued)

Good Management Practices	
Number	**Title**
FUG-01	Improved Leak Detection and Repair [VOC]
FUG-02	Emission Reductions from Gasoline Transfer and Dispensing Facilities [VOC]
FUG-04	Further Emission Reductions from Pipeline and Storage Tank Degassing [VOC]
BCM-01	PM Control Devices (Baghouses, Wet Scrubbers, Electrostatic Precipitators, and Other Devices) [PM]
MCS-04	Emissions Reduction from Green Waste Composting [VOC and PM]
MCS-06	Improved Start-up, Shut-down & Turnaround Procedures [All Pollutants]
Market Incentives/Compliance Flexibility	
Number	**Title**
CTS-02	Clean Coatings Certification Program [VOC]
CMB-02	Further SOx Reduction for RECLAIM [SOx]
MCS-08	Clean Air Act Emission Fees for Major Stationary Sources [VOC and NOx]
FLX-01	Economic Incentive Programs [All Pollutants]
FLX-02	Petroleum Refinery Pilot Program [VOC and PM2.5]
Emission Growth Management	
Number	**Title**
EGM-01	Emission Reductions from New or Redevelopment Projects [NOx, VOC and PM2.5]
EGM-02	Emission Budget and Mitigation for General Conformity Projects [All Pollutants]
EGM-03	Emissions Mitigation at Federally Permitted Projects [All Pollutants]

TABLE 1 (continued)

Area Source Programs	
CTS-01	Emission Reductions from Lubricants [VOC]
CTS-03	Consumer Product Certification and Emission Reductions from Use of Consumer Products at Institutional and Commercial Facilities [VOC]
CTS-04	Emission Reductions from the Reduction of VOC Content of Consumer Products not Regulated by the State Board [VOC]
FUG-03	Further Emission Reductions from Cutback Asphalts [VOC]
CMB-01	NOx Reduction from Non-RECLAIM Ovens, Dryers and Furnaces [NOx]
CMB-03	Further NOx Reductions from Space Heaters [NOx])
CMB-04	Natural Gas Fuel Specifications [All Pollutants]
BCM-02	PM Emission Hot Spots – Localized Control Programs [PM]
BCM-03	Emission Reductions from Wood Burning Fireplaces and Wood Stoves [PM]
BCM-04	Additional PM Emission Reductions from Rule 444 – Open Burning [PM]
BCM-05	Emission Reductions from Under-Fired Charbroilers [PM]
MCS-05	Emission Reductions from Livestock Waste [VOC]
MCS-07	Application of All Feasible Measures [All Pollutants]
Mobile Source Control	
Number	**Title**
MOB-01	Mitigation for Federal Sources [NOx]
MOB-02	Extended Exchange Program [All Pollutants]
MOB-03	Backstop Measures for Indirect Sources of Emissions from Ports and Port-Related Facilities [NOx, SOx, and PM]
MOB-04	Emission Reductions from the Carl Moyer Program [NOx and PM]
MOB-05	AB 923 Light-Duty Vehicle Program [VOC, NOx, PM]
MOB-06	AB 923 Medium-Duty Vehicle Program [NOx, PM]
MOB-07	Concurrent Reductions from Global Warming Strategies [All Pollutants]

Emission reduction associated with the District's SIP commitment to adopt and implement short-term VOC, PM10, NO_x, and SO_x emission reductions from sources under the District's jurisdiction will be prepared in the next several months based on revised emission inventories and public comments on strategies. Once the SIP commitment is accepted, should there be emission reduction shortfalls in any given year, the District would identify and adopt other measures to make up the shortfall. Similarly,

if excess emission reductions are achieved in a year, they can be used in that year or carried over to subsequent years if necessary to meet reduction goals.

Coating and Solvents

The category of coatings and solvents is primarily targeted at reducing VOC emissions from VOC-containing products such as coatings and solvents. This category includes four control measures that are based on additional emission reductions from lubricants, institutional and commercial consumer products and other miscellaneous coatings and an introduction of consumer product certification, representing an expansion of the current Clean Solvent Certification Program and, limiting the VOC content in consumer products not regulated by the State Board.

Petroleum Operations and Fugitive VOC Emissions

This category pertains primarily to operations and materials associated with the petroleum, chemical, and other industries. Within this category, there is one control measure targeting fugitive VOC emissions with improved leak detection and repair. Other measures include reductions from gasoline transfer and dispensing, pipeline and storage tank degassing and cutback asphalt facilities.

Combustion Sources

This category includes four measures targeting stationary combustion equipment. There is one control measure reducing NOx from non-RECLAIM ovens, dryers, and furnaces. A second measure targets the reduction of SOx emissions from RECLAIM facilities. In addition, there is one new control measure that seeks to further reduce NO_x emissions from space heaters. The last measure seeks to specify fuel standards for natural gas used in stationary sources as a means of preventing potential increase in NO_x emissions.

PM Sources

This category includes three new control measures which would require further reductions from PM control devices and a localized control and enhanced open burning programs. The localized controls would be introduced in high PM areas to ensure PM10 attainment demonstration. There are also two control measures that have been carried over from the 2003 AQMP, i.e., PM reductions from wood stoves and charbroilers.

Multiple Component Sources

There are a total of eight control measures in this category. The first measure seeks reductions of all criteria pollutants through the modernization of permitted equipment and the application of supercompliant materials. The approach behind this measure is to either replace or retrofit existing equipment at the end of a pre-determined life span with today's BACT and utilize today's supercompliant materials at a future date. In addition

a new control measure has been introduced to promote energy efficiency and conservation.

Two of these control measures are included in this category that address VOC and ammonia emissions from non-dairy livestock waste and composting operations. Another measure promotes the use of lighter color roofing, road materials, or tree planting. Two measures seek to minimize emissions during equipment start up and shut down and reduce emissions by applying the state requirement of all feasible control measures. The last measure would place an emission charge for VOC and NOx major stationary sources.

Compliance Flexibility Programs

This category includes a control measure carried-over from the 2003 AQMP that enhances regulatory compliance by providing additional flexibility and compliance options thereby lowering compliance costs and incentivizing early reductions and advancement of clean technologies. A second control measure was mentioned in the 2003 AQMP but not listed as a Control Measure. This measure is a pilot program that could be used by the Petroleum Refining businesses as a compliance option to achieve their emission reduction obligations through either on-site or off-site controls.

Emission Growth Management

There are three control measures within this category. The first measure addresses emission reductions from new or redevelopment projects. District staff convened a working group made up of stakeholders from industry, local governments, and community representatives. Three working group meetings were held and staff prepared the following approach: The District will develop a rule that specifies applicability criteria for new or redevelopment projects and will involve the selection of mitigation measures from a menu of technically feasible mitigation options. The last two new control measures address the General Conformity projects. The first of these measures creates an emissions budget and mitigation program for these projects. The second measure addresses the impacts of federally permitted projects on the District.

District's Mobile Source Control Measures

The District is proposing seven control measures for mobile sources. One control measure seeks to impose a mitigation fee program on federal sources such as planes, trains, and ships in order to fund emission reduction projects. The second measure promotes accelerated turn-over of in-use small off-road engines (SORE) and other engines such as recreational outboard engines through expanded voluntary exchange programs. The third measure introduces backstop measures for indirect sources of emissions from ports and port-related facilities. The fourth measure proposes to take credit for the emission reductions achieved through past and future projects funded under the Carl Moyer Program. The fifth and sixth measures identify categories of

vehicles and augment the current smog check program. The last measure relies on concurrent reductions in criteria pollutants associated with implementation of strategies to reduce global warming gases as specified in Assembly Bill 32.

EVALUATION OF CONTROL MEASURES PROPOSED BY OTHER DISTRICTS/STATES

In an effort to ensure that all feasible measures are incorporated in the 2007 AQMP, in additional Reasonably Available Control Measure (RACM) demonstration included in Appendix VI, staff has review and evaluated control measures proposed by other districts and states for inclusion into their respective SIPs. Specifically, staff reviewed the following documents:

- Final Draft 8-Hour Ozone Plan for San Joaquin Valley, California (Serious)
- Draft 8-Hour Ozone Plan for Sacramento Metropolitan, California (Serious)
- Final 2006 1-hour Ozone Plan for San Francisco Bay Area, California (Moderate)
- Final list of control strategies of North Central Texas Council of Governments developed to be used for Dallas-Fort Worth and Houston-Galveston-Brazoria, Texas (Moderate)
- Final list of control measures of Lake Michigan Air Directors Consortium (LADCO) or Midwest Regional Planning Organization (Midwest RPO) developed to be considered by the five states in the Midwest (Illinois, Indiana, Michigan, Ohio and Wisconsin).

In general, the District's current rules and regulations and control measures proposed in the 2007 AQMP are equivalent to or more stringent than those developed by other air districts. A summary of the control measures and the process of developing these control measures in other air districts is provided below and is summarized in Table A-1 of Attachment A.

RULE EFFECTIVENESS

The 1990 federal Clean Air Act requires that emissions inventories be adjusted to reflect the rule effectiveness. As defined by EPA, rule effectiveness reflects how emission reductions due to implementation of a regulatory program are estimated. EPA suggests a default value of 80 percent if emission reductions are estimated based on projected control efficiencies and emission factors. If a higher rule effectiveness value is used the District needs to demonstrate how these emission reductions will be achieved.

As described below under Rule Compliance and Test Methods, the compliance demonstration for each proposed control measure, where the District accounted for emission reductions, identifies the compliance mechanisms such as recordkeeping,

inspection and maintenance activities, etc., and test methods such as District, ARB, and EPA approved test methods. The District's on going source testing and on-site inspection programs also strengthen the status of compliance verification. In addition, the District conducts workshops, compliance education programs to inform facility operators on rule requirements and assist them in performing recordkeeping and self inspections. These compliance tools are designed to ensure rule compliance would be achieved on a continued basis. As a result, the control measures proposed in this appendix with quantifiable emission reductions are based on a rule effectiveness of 100 percent.

FORMAT OF CONTROL MEASURES

Included in each control measure description is a title, summary table, description of source category (including background and regulatory history), proposed method of control, estimated emission reductions, rule compliance, test methods, cost effectiveness, and references. The type of information that can be found under each of these subheadings is described below.

Control Measure Number

Each control measure is identified by a control measure number such as "CM #2007MCS-04" located at the upper right hand corner of every page. "CM #" is the abbreviation for the "control measure number" and is immediately followed by the year of the AQMP revision.

The next three-letter designation, "CTS" represents the abbreviation for a source category or specific programs. For example "CTS" is an abbreviation for "Coatings and Solvents." The following provides a description of the abbreviations for each of the measures.

- CTS Coatings and Solvents
- CMB Combustion Sources
- FUG Fugitive Emissions
- MCS Multiple Component Sources
- BCM Best Available Control Measures for Fugitive Dust Sources
- FLX Compliance Flexibility Programs
- EGM Emission Growth Management
- MOB Mobile Source Programs

If the measure is based on a control measure from the 2003 AQMP, the former control measure number appears in parentheses after the 2007 AQMP number. For example, 2007 AQMP Control Measure CM #2007CMB-04 Natural Gas Fuel Specifications would also have the designation (CM #2003MSC-07).

Title

The title contains the control measure name and the major pollutant(s) controlled by the measure. Titles that state "Control of Emissions from..." indicate that the measure is regulating a new source category, not presently regulated by an existing source- specific District rule. Titles that state "Further Emission Reductions of" imply that the measure would result in an amendment to an existing District rule.

Summary Table

Each measure contains a table that summarizes the measure and is designed to identify the key components of the control measure. The table contains a brief explanation of the source category, control method, emission reductions, control costs, and implementing agency.

Description of Source Category

This section provides an overall description of the source category and the intent of the control measure. The source category is presented in two sections, background and regulatory history. The background has basic information about the control measure such as the number of sources in the Basin, description of emission sources, and pollutants.

The regulatory history contains information regarding existing regulatory control of the source category such as applicable District rules or regulations and if the source category was identified in the 1999 or prior AQMPs.

Proposed Method of Control

The purpose of this section is to identify potential control options an emission source can use to achieve emission reductions. If an expected performance for a control option is provided, it is intended for informational purposes only and should not be interpreted as the targeted overall control efficiency for the proposed control measure. To the extent feasible, the overall control efficiency for a control measure should take into account achievable controls in the field by various subcategories within the control measure. A more detailed type of this analysis is typically conducted during rulemaking, not in the planning stage. It has been the District's long standing policy not to exclude any control technology and to intentionally identified as many control options as possible to spur further technology development.

In addition to the proposed control methods discussed in each control measure, affected sources may have the option of partially satisfying the emission reduction requirements of each control measure with compliance flexibility programs currently available, or those that will become available in the future from the on-going implementation of control measure CM #2007FLX-01. Examples of compliance flexibility programs currently available include Rule 2020 – RECLAIM Reserve and the pilot credit generation rules under Regulation XVI – Mobile Source Offset Programs. Future enhancements to Regulation XVI may include additional opportunities to generate and use credits from mobile sources which could advance the utilization of these credit rules and other compliance flexibility programs similar to regulation XVI.

Emissions Reduction

The emission reductions are estimates based on the baseline inventories prepared for the 2007 AQMP and are provided in the Control Measure Summary Table. The emissions data are based on the annual average inventory for all five criteria pollutants. The planning inventory adjusts the emissions by taking into consideration a source category's seasonal variations. The emissions affecting ozone concentration (i.e., VOC and NO_x) are presented under the Summer Planning Inventory. The emissions section of the summary table includes the 2002, 2014, and 2023 inventory. The 2014 and 2023 emission projections reflect implementation of District adopted rules. Based on the expected reductions associated with implementing the control measure, emission data are calculated for 2014 and 2023 assuming the implementation of the control measure in the absence of other competing control measures.

The emission reductions listed in the summary table represent the current best estimates, which are subject to change during rule development. As demonstrated in previous rulemaking, the District is always seeking maximum emission reductions when proven technically feasible and cost-effective. For emission accounting purposes, a weighted average control efficiency is calculated based on the targeted controls. The concept of weighted average acknowledges the fact that a control measure or rule consists of several subcategories, and the emission reduction potential for each subcategory is a function of proposed emission limitation and the associated emission inventory. Therefore, the use of control efficiency to estimate emission reductions does not represent a commitment by the District to require emission reductions uniformly across source categories. In addition, due to the current structure of emission inventory reporting system, a control measure may partially affect an inventory source category (e.g., certain size of equipment or certain level material usage). In this case, an impact factor is incorporated into the calculation of a control efficiency to account for the fraction of inventory affected. During the rule development, the most current inventory will be used. However, for tracking rate-of-progress on the SIP emission reduction commitment, the approved AQMP inventory will be used. More specifically, emission

reductions due to mandatory or voluntary, but enforceable, actions will be credited under SIP obligations.

Rule Compliance

This section was designed to satisfy requirements in the 1990 Clean Air Act in which EPA has indicated that it is necessary to have a discussion of rule compliance with each control measure. This section discusses the recordkeeping and monitoring requirements envisioned for the control measure. In general the District would continue to verify rule compliance through site inspections and submittal of compliance plans.

Test Methods

In addition to requiring recordkeeping and monitoring requirements, EPA has stated that "An enforceable regulation must also contain test procedures in order to determine whether sources are in compliance." This section of the control measure write-up identifies appropriate approved District, ARB, and EPA source test methods.

Cost Effectiveness

The Discounted Cash Flow (DCF) method is used to calculate the cost-effectiveness of each control measure. As control measures undergo the rule making process, more detailed control costs will be developed.

The cost effectiveness values contained herein, may overestimate actual levels because of a number of affected factors. As additional information on costs and more accurate numbers of affected facilities becomes available, the cost effectiveness will be revised and analyzed in the socioeconomic assessment report of the 2007 AQMP.

Implementing Agency

This section identifies the agency(ies) responsibility for implementing the control measure. Also included in this section is a description of any jurisdictional issues that may affect the control measure's implementation.

References

This section identifies directly cited references, or those references used for general background information.

GROUP 1

Coatings and Solvents

EMISSION REDUCTIONS FROM LUBRICANTS [VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	INDUSTRIAL LUBRICANTS
CONTROL METHODS:	PHASE I: REFINE EMISSIONS INVENTORY IDENTIFY LOW-EMITTING ALTERNATIVES AND ENCOURAGE INDUSTRIES TO SWITCH FROM HIGH VOC CONTENT LUBRICANTS TO ALTERNATIVE SOLVENTS PHASE II: RULE DEVELOPMENT TO LIMIT EMISSIONS AT THE SOURCE AND/OR LIMIT VOC CONTENT AT POINT OF SALE/USE

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	5.2	6.0	6.4
VOC REDUCTION		1.9	2.0
VOC REMAINING		4.1	4.4

SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	5.2	6.0	6.4
VOC REDUCTION		1.9	2.0
VOC REMAINING		4.1	4.4

CONTROL COST:	$1,000 TO 5,000 PER TON VOC REDUCED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The proposed control measure seeks to reduce VOC emissions from the use of lubricants which are utilized by a variety of different industries and new facility processes.

Background

A control measure was included in the 2003 AQMP to reduce VOC emissions from miscellaneous industrial coatings and solvent operations. The total estimated annual average emissions from these sources, without mitigation, were 13.9 tons per day in 2006 and 15.2 tons per day by 2010.

This 2007 AQMP control measure would seek to reduce VOC emissions from industrial lubricants, a category under solvent operations, over a defined implementation period. Lubricants include products such as coolants in manufacturing processes; stamping fluids; vanishing oils; and cutting, forming, and honing oils, and are used by various companies in the South Coast Air Basin including, but not limited to, machine shops, auto rebuilders, and auto

parts manufacturers. Many lubricants and their additives, such as rust and corrosion inhibitors, are at least 50 percent VOC solvents and are believed to emit a significant amount of VOCs. In addition, mineral spirits and kerosene used to dilute lubricants contain traces of benzene, toluene, and xylene, which are all classified as Hazardous Air Pollutants (HAPs) by the EPA and Toxic Air Contaminants (TACs) by the state of California. Benzene is established as a human carcinogen and toluene and xylene, respectively, have been proven to cause central nervous system damage and birth defects. `

Regulatory History

As stated in the previous section, lubricants are categorized under miscellaneous solvent operations. They are currently subject to Rule 442, "Usage of Solvents," which reduces VOC emissions from VOC-containing materials that are not subject to VOC limits in any Regulation XI rule. Currently, there are no regulations or emissions restrictions specifically concerned with industrial lubricants in place at the local, state, or federal levels.

PROPOSED METHOD OF CONTROL

There would be two potential implementation phases, enacted in an order that would bring about reductions in the most expedient manner. The first phase would involve refining the emissions inventory and identifying low-emitting alternatives to existing high-VOC lubricants and encouraging industries currently using high-VOC content products to voluntarily switch over to less-polluting ones. The second phase would involve developing a rule that would further reduce source emissions by either placing an overall emissions limit by source, or by limiting VOC content in lubricant formulations at the point of sale and/or use. This reduction is based on the fact that a smaller fraction of all industrial lubricants are virtually 100 percent VOC. Implementation of this control measure would target a minimum overall VOC reduction of 35 percent or 1.9 tons per day by year 2014.

There are important points that should be noted when discussing these phases. First, there are low- and non-emitting alternatives to petroleum-based lubricants available on the market, including synthetics, semi-synthetics, and vegetable oils. Thus, feasible reduction requirements could apply to the end user, as well as be imposed at the point of sale. A second notable point is that different types of machinery require different lubricant formulations. It should be made certain that the technological feasibility and cost impact of all alternatives to specific lubricant materials be assessed. Further consideration must also be given to possible toxic constituents in any reformulation or other alternatives.

EMISSIONS REDUCTION

Feasible emission reductions from currently available alternative products are estimated to be 2.0 tpd in the year 2023.

RULE COMPLIANCE

Rule compliance would be achieved with compliance requirements under Regulation XI - Source Specific Rules. Recordkeeping and monitoring requirements would be similar to Rule 109.

TEST METHODS

The applicable testing methods are uncertain at this time and would require further analysis during the rulemaking process.

COST EFFECTIVENESS

The cost effectiveness of this control measure ranges between $1,000 per ton of VOC reduced to $5,000 based on the annualized cost comparisons conducted by the Institute for Research and Technical Assistance in their report entitled "Assessment, Development and Demonstration of Alternatives to VOC-Emitting Lubricants, Vanishing Oils and Rust Inhibitors". The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to regulate VOC emissions from industrial coating and solvent operations, under which industrial lubricants are categorized.

REFERENCES

EPA Proposal Submittal. "Alternatives to VOC Emitting Lubricants and Rust Inhibitors" 2004.

Institute for Research and Technical Assistance. "Assessment, Development and Demonstration of Alternatives to VOC-Emitting Lubricants, Vanishing Oils and Rust Inhibitors", August 2006.

CLEAN COATINGS CERTIFICATION PROGRAM [VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	COATING MATERIALS
CONTROL METHODS:	STEP I: DEVELOPMENT OF CERTIFICATION PROGRAM FOR COATINGS WITH LOW-, ULTRA LOW-, OR ZERO-VOC CONTENT STEP II: ALLOW FOR REDUCTION OF EMISSION FEES TO MANUFACTURERS OF COATINGS WITH LOW-VOC CONTENT

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD

SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD

CONTROL COST:	TO BE DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

Although industrial coatings have been subject to controls for many years, they remain a significant source of VOC emissions. This control measure would seek to implement a VOC content certification program for lower VOC coatings, similar to that for Clean Air Solvents, which would influence industrial and other consumers' purchase decisions toward products with lower emissions. Manufacturers would then be encouraged to lower their VOC content, thus possibly reducing emissions beyond what traditional control rules would mandate. VOC emissions can cause adverse health impacts, such as headaches, nausea, allergic reactions, and other health problems in humans if inhaled. They also contribute to the formation of ozone and PM2.5, which can affect pulmonary functions and limit visibility.

Regulatory History

Previously, under Rule 1171 – Solvent Cleaning Operations, Clean Air Solvent certificates were issued to manufacturers, distributors, or any person for materials that met the criteria for a Clean Air Solvent. Key to that certification is that, among other criteria, the solvent contains no more than 25 grams of VOC per liter of material and the certification is valid for five years.

PROPOSED METHOD OF CONTROL

First, a certification criteria would be established for distinguishing products that are considered supercompliant (i.e. low-, ultra low-, or zero-VOC content levels), from other compliant products. Secondly, a certification process would be established for those products meeting the "Clean Air Coating" criteria. Certified products would be allowed to use the District certification and promote the products as being "environmental friendly."

Should the District produce fee related programs for VOC products, consideration will be given to promote super compliant products.

EMISSIONS REDUCTION

This voluntary certification program's objective is to positively influence industrial, commercial, and consumer behavior in selecting ultra-low volatile organic compound (VOC) coatings and foster the marketing of ultra-low polluting technologies in an overall effort to reduce VOC emissions. Any VOC reductions due to promoting the use of ultra-low VOC coatings will be quantified via future SIP revisions.

RULE COMPLIANCE

This control measure would seek to amend applicable rules in Regulations II and XI to incorporate a Clean Air Coating Certification Program, similar to that for clean air solvents, as well as be considered in any future regulatory development. The District will explore the feasibility of voluntary and mandatory programs through amendments to Regulation XI and other rules. Conceptually, mandatory versus voluntary participation in the certification program is directly related to the District requiring all architectural coating products to be certified in order to be sold and applied within the District.

Essentially, if the program is voluntary, those coatings that are certified could benefit by not being subject to emission fees whereas non-certified products would pay a fee. Conversely, if it were mandatory, every coating manufacturer would need to certify their products. The fees could be assessed on a sliding scale with super compliant products, requiring little or no emission fees. The method of control would also include public education, outreach, and various marketing elements to help incentivize manufacturers and create consumer awareness and demand.

TEST METHODS

EPA Method 24 and SCAMQD Method 304 are rigorous test methods that provide accurate and reliable results when measuring the volatile organic content (VOC) of many coatings, but there is inherent variability when employing Method 24 to analyze the VOC content of low-VOC

waterborne coatings. The District has been working with the EPA, ARB, ASTM as well as members of academia and industry to develop an improved test method for the analysis of low VOC coatings. ASTM Method D 6886 Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography yields far greater precision than EPA Method 24 for low VOC waterborne coatings.

COST EFFECTIVENESS

Cost-effectiveness has not been determined for this measure.

IMPLEMENTING AGENCY

Both the CARB and the District have the authority to regulate consumer products emissions.

CONSUMER PRODUCT CERTIFICATION AND EMISSION REDUCTIONS FROM USE OF CONSUMER PRODUCTS AT INSTITUTIONAL AND COMMERCIAL FACILITIES [VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: CONSUMER PRODUCTS

CONTROL METHODS: STEP I: DEVELOPMENT OF CERTIFICATION PROGRAM FOR CONSUMER PRODUCTS.

STEP II: PROMOTING USE OF CONSUMER PRODUCTS (ULTRA LOW- OR ZERO-VOC PRODUCTS) AT HIGH VOLUME COMMERCIAL AND INSTITUTIONAL FACILITIES.

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	23.1	21.0	20.5
VOC REDUCTION		2.1	2.2
VOC REMAINING		18.9	18.3

CONTROL COST: SEE COST EFFECTIVENESS SECTION

IMPLEMENTING AGENCY: ARB AND AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

Consumer products are defined under the California Health and Safety Code (HSC) as chemically formulated products used by institutional and household consumers. They include products such as detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. Paint products, and furniture or architectural coatings are not included. The California Air Resources Board (ARB) further defines institutional cleaning as the cleaning of building or facility components including, but not limited to, floors, ceilings, walls, windows, doors, stairs, bathrooms, furnishings, and exterior surfaces of office equipment. Many of these commonly used consumer products have high-VOC contents and are the focus of ARBs efforts in the reduction of smog in California. In the year 2005, the contribution of VOCs from Consumer Products used in California was estimated at 245 tons per day or about 110 tons per day for the South Coast Air Quality Management (District). The inventory claim for this measure is an estimate of emissions from those consumer products used at institutional and commercial facilities.

This control measure would seek to reduce VOCs from consumer products used at commercial and institutional facilities by and through the use of marketing strategies and regulatory

mandates. VOC emissions can cause adverse health impacts, such as headaches, nausea, allergic reactions, and other health problems in humans if inhaled. They also contribute to the formation of ozone and PM10, which can affect pulmonary functions and limit visibility.

This control measure would seek to develop new rules or programs to establish a VOC certification program, and to incentivize high volume users toward super compliant products resulting in overall reductions in VOCs. Staff research has shown that there are low-and zero-VOC commercial and institutional products available that are below current and proposed limits in ARBs Consumer Products Regulation. For example, a local supplier of environmentally friendly cleaning products, Natural Solutions, has over twenty products available for commercial and institutional use ranging from 0 to 4% by weight of VOCs prior to dilution. Similar products under the current and future limits of ARBs Consumer Product Regulation range from 1% to 4% as applied, implying typically higher VOC ranges prior to dilution creating an even larger comparative differential.

Regulatory History

The California Air Resources Board (ARB) has the authority to regulate consumer products under Section 41712 of the California Health and Safety Code (HSC). Local Air Pollution Control Districts may restrict the use of consumer products at stationary and area sources of emissions, to limit the overall contribution of VOCs attributable to the formation of smog, may regulate consumer products that are not already regulated by ARB, and potentially may limit the use of consumer products at institutional and commercial sources.

PROPOSED METHOD OF CONTROL

Commercial and institutional consumer products used at facilities conducting business within the District would be targeted under this control measure, which would be implemented in two steps through specific rule development.

First, a certification program would be established to distinguish products that are super compliant containing ultra low- or zero-VOC content levels, otherwise referred to as “green” products, from products with higher-VOC content.

Second, following implementation of the certification program, a usage limitation (or a prohibition of use) or other control method would be adopted for consumer products to facilitate the use of ultra low- or zero-VOC products at high volume commercial and institutional facilities to the extent that the District is able to under State law, or the District will request ARB to adopt such a rule.

EMISSIONS REDUCTION

Emission reductions from commercially available consumer products are expected to be about 2.1 tpd by the year 2014 and 2.2 tpd by 2023. Reductions achieved through this measure will contribute to ARB's SIP commitment for this source category.

RULE COMPLIANCE

Step I: New labeling program for manufacturers or distributors with criteria developed under a public process.

Step II: Create a usage limitation or a prohibition of use, or the District will request ARB to adopt such a rule.

TEST METHODS

United States Environmental Protection Agency (USEPA) Reference Method 24 (Code of Federal Regulations, Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by the District Method 303 (Determination Exempt Compounds) contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual; or,

District Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Materials] contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual.

COST EFFECTIVENESS

No increase in cost is expected from this control measure. The California Department of General Services' "Green Building Initiative" concludes that, "Environmentally preferred cleaners are generally competitively priced. This includes the purchase price of the product, the cost of meeting regulations for worker safety and environmental rules, and the costs of disposal for leftover product."

IMPLEMENTING AGENCY

Step I to be implemented by the District with Step II under ARB and/or District regulatory authority.

EMISSION REDUCTIONS FROM THE REDUCTION OF VOC CONTENT OF CONSUMER PRODUCTS NOT REGULATED BY THE STATE BOARD [VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: CONSUMER PRODUCTS

CONTROL METHODS: LIMITATION OF VOC CONTENT FOR SELECTED CONSUMER PRODUCTS THAT ARE PRIMARILY USED BY INSTITUTIONAL AND INDUSTRIAL FACILITIES AND ARE CURRENTLY UNREGULATED BY THE CALIFORNIA AIR RESOURCES BOARD

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	6.3	7.3	7.6
VOC REDUCTION		5.8	6.0
VOC REMAINING		1.5	1.6
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	6.3	7.3	7.6
VOC REDUCTION		5.8	6.0
VOC REMAINING		1.5	1.6

CONTROL COST: $3,000 TO 5,000 PER TON VOC REDUCED

IMPLEMENTING AGENCY: AQMD/CARB

DESCRIPTION OF SOURCE CATEGORY

Background

The California Health and Safety Code (HSC) defines a "Consumer product" as a chemically formulated product used by household and institutional consumers. HSC 41712 (f) prohibits air quality districts from adopting regulations pertaining to a consumer product that is different from any regulation adopted by the state board. Several consumer product categories, including Lacquer Thinners and Paint Thinners, are unregulated by the California Air Resources Board (ARB). The two categories have significant emissions within the South Coast Air Basin. According to ARB, between 54% and 97% of the above mentioned product categories are used by institutional and industrial facilities.

This control measure would seek to reduce VOCs from lacquer thinners and paint thinners sold as consumer products by establishing a VOC content limit for each of those categories.

Regulatory History

ARB has the authority to regulate consumer products under Section 41712 of the HSC. Local Air Pollution Control Districts may restrict the use of consumer products at stationary and area sources of emissions to limit the overall contribution of VOCs attributable to the formation of smog, regulate consumer products that are not already regulated by ARB, and potentially limit the use of consumer products at institutional, industrial and commercial sources.

Most lacquer thinners and paint thinners distributed and sold as consumer products are pure solvents with a very high VOC content. Rule 1171 – Solvent Cleaning Operations and associated technology assessments conducted to support the rule, revealed the viability of lower VOC products that are currently in use by many industrial and commercial operations. This low VOC product technology can easily be adapted to meet consumer application needs.

PROPOSED METHOD OF CONTROL

Products used at facilities conducting business within the district would be targeted under the control measure and would be implemented through specific rule development. Similar to Rule 1174 – Control of Volatile Organic Compound Emissions from the Ignition of Barbecue Charcoal, the rule would apply to suppliers, distributors and retailers of paint thinners and lacquer thinners. It would limit the VOC content of products sold to consumers, including institutional and industrial facilities.

EMISSION REDUCTION

The expected emission reduction would be based on the final VOC content limit allowed for paint thinners and lacquer thinners. The primary uses are thinning and cleaning of coatings and adhesives. Rule 1171 – Solvent Cleaning Operations, has a VOC content limit of 100 g/l for similar cleaning activities. If such a limit were adopted, the expected emission reduction would be 5.8 tons per day in 2014 and 6.0 tons per day by 2023. Any emission reductions resulting from the implementation of this control measure will be credited towards the District's SIP obligation provided ARB does not develop a similar regulation. Any remaining excess reductions will then contribute to fulfilling ARB's SIP commitment.

RULE COMPLIANCE

Create a VOC content limit for suppliers, distributors and retailers of paint thinners and lacquer thinners.

TEST METHODS

United States Environmental Protection Agency (USEPA) Reference Method 24 (Code of Federal Regulations, Title 40, Part 60, Appendix A). The exempt compounds content shall be determined by the District Method 303 (Determination Exempt Compounds) contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual; or District Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Material] contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual.

COST EFFECTIVENESS

The cost effectiveness of this control measure ranges between $3,000 per ton of VOC reduced to $5,000 based on the cost differential between existing solvent-based thinners and low-VOC thinners and clean-up solvents used to comply with other District regulations. The District staff will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to implement this measure.

GROUP 2

Petroleum Operations and Fugitive VOC Emissions

IMPROVED LEAK DETECTION AND REPAIR

[VOC]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	FUGITIVE EMISSION SOURCES
CONTROL METHODS:	PHASE I: PILOT PROGRAM – OPTICAL GAS IMAGING (SMART LDAR) PHASE II: FULL IMPLEMENTATION OF SMART LDAR PROGRAMS
EMISSIONS (TONS/DAY)	NOT DETERMINED
CONTROL COST:	UP TO $100,000 PER UNIT
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Control Measure #FUG-01 is a new control measure that targets a variety of fugitive emissions sources including, but not limited to, oil and gas production facilities, petroleum and chemical products processing, storage and transfer facilities, marine terminals, and other sources contributing to fugitive emissions. Most of these facilities are required under District and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components.

The scope of Control Measure FUG–01 is to enhance the effectiveness of existing LDAR programs by identifying and repairing leaks sooner and in a manner that is less time consuming and labor intensive and expand the applicability of LDAR programs to areas currently not covered by existing rules such as harbor vessels. For this purpose, the new control measure uses recently developed technology, called optical gas imaging, to detect leaks (Smart LDAR). There are two types of optical gas imaging instruments: active and passive. The active type uses a laser beam that is reflected by the background; and the attenuation of the beam traversing through a hydrocarbon cloud provides the optical image. The passive type uses the ambient illumination to detect the difference in heat radiance of the hydrocarbon cloud. For either type, the instrument displays an image of the hydrocarbon plume.

Background

Fugitive VOC leaks have been the subject of control measures in previous AQMPs since they are ozone precursors and contribute to formation of smog. Several District rules that affect petroleum and chemical-related industries, such as oil refineries, oil and gas production fields, natural gas processing plants, pipeline transfer stations and chemical plants have some kind of requirement involving the periodic inspection of piping components and the detection and repair of leaks.

Fugitive leaks are detected with an organic vapor analyzer (OVA) that measures the leak rate for each component, using U.S. EPA Reference Method 21. In the early 1970s, U.S. EPA initiated the Petroleum Refinery Assessment Study, which developed average emission factors for each type of piping component (valve, flange, pump, etc) and concluded that mass emission rates are dependent of the phase of the process stream (gas/vapor, light liquid and heavy liquid) and the relative volatility of the liquid stream.

Mass emissions from fugitive leaks can be calculated based on correlation equations developed by the U.S. EPA based on data from the 1994 Refinery Equipment Leak Report. Mass emissions are calculated by inserting the measured leak rates into the correlation equations specific for each type of component, such as valve, flange, pump, compressor, etc.

The current LDAR program has been successful in significantly reducing fugitive VOC emissions from a variety of sources. However, the latest technology provides opportunities for further improvements in the efficiency of the conventional LDAR program and for further reductions.

Regulatory History

Fugitive emissions are currently regulated under various District rules that require a LDAR program: Rules 462 – Organic Liquid Loading, 463 – Storage of Organic Liquids, 1142 – Marine Vessel Tank Operations, 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum and Chemical Plants, 1176 – Sumps and Wastewater Separators, and 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities.

PROPOSED METHOD OF CONTROL

This control measure will be implemented in two phases: Phase I will be a pilot LDAR program involving familiarization with the new technology and establishing implementation protocols, and will involve the identification of facilities/industries currently subject to LDAR programs as well as others that are not where the new technology can successfully be utilized. Based on the results of Phase I, fugitive VOC rules, if feasible, will be amended under a subsequent phase (Phase II) to enhance their applicability, effectiveness, and to further reduce emissions.

EMISSIONS REDUCTION

The emission reductions from this control measure have not been determined.

RULE COMPLIANCE

Rule compliance would be similar to compliance requirements under existing Rules 462, 463, 1142, 1173, 1176, and 1178. Recordkeeping and monitoring requirements would be similar to Rule 109.

TEST METHODS

Test methods include the following:

U.S. EPA Reference Method 21 - Determination of Volatile Organic Compounds Leaks.

Federal Register Vol. 71, No. 66 April 6, 2006 - Alternative Work Practice To Detect Leaks From Equipment.

COST EFFECTIVENESS

There are no claimed emission reductions associated with this control measure and therefore cost effectiveness is not calculated.

IMPLEMENTING AGENCY

The District has authority to regulate fugitive VOC emissions sources.

REFERENCES

U.S. EPA – Protocol for Equipment Leak Emission Estimates, November 1995.

Federal Register /Vol. 71, No. 66/April 6, 2006, Alternative Work Practice To Detect Leaks From Equipment.

EMISSION REDUCTIONS FROM GASOLINE TRANSFER AND DISPENSING [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	GASOLINE TRANSFER AND DISPENSING		
CONTROL METHODS:	IMPROVE THE IMPLEMENTATION OF THE ENHANCED VAPOR RECOVERY REGULATION		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	17.3	17.3	19.0
VOC REDUCTION		3.7	4.1
VOC REMAINING		13.6	14.9
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	17.3	17.3	19.0
VOC REDUCTION		3.7	4.1
VOC REMAINING		13.6	14.9
CONTROL COST:	$1,673 PER TON VOC REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce VOC and toxic emissions from gasoline dispensing facilities (GDFs) by improving implementation of the Enhanced Vapor Recovery (EVR) Regulation.

Background

GDFs represent the second largest emission source category under the District's regulatory authority, following architectural coatings. Emissions from GDFs are regulated by the Enhanced Vapor Recovery (EVR) regulation of the California Air Resources Board (CARB) and the District's Rule 461.

In March 2000, California Air Resources Board (CARB) amended the EVR to reduce VOC and toxic emissions from the transfer and dispensing of gasoline at GDFS (service stations). The EVR includes testing and certification procedures to improve the performance and specifications of both Phase I and Phase II vapor recovery systems.

The EVR for Phase I (one module) included the improvements of the spill containment and covers; rotatable product and vapor adaptors; overfill prevention device; and pressure vacuum vent gauges. Phase I module for both the balance and the vacuum assist systems was completely implemented on April 1, 2005.

The EVR for Phase II (five modules) includes, but is not limited to, the onboard refueling vapor recovery (ORVR), and the in-station diagnostic (ISD). The ORVR routes gasoline vapor

displaced during vehicle fueling to the onboard canister on the vehicle. The ISD is designed to provide continuous real-time monitoring of vapor collection and containment efficiencies; alert the GDF operator when a failure mode is detected so that corrective action can be taken; shut down the dispensers, if repairs are ignored; and provide compliance records. Presently, the ISD is only certified and installed on the Healy VR 202 (Veeder-Root ISD) system. The ISD for the balance system and other vacuum assist systems are in the testing program phase (180 days) and the complete implementation of the ISD for both balance and vacuum assist systems is scheduled for 2009-2010.

There are approximately 3400 retail GDFs and 1500 non-retail GDFs in the Basin with a total approximate throughput of 7 billion gallons per year. Current regulatory structure seeks to reduce the uncontrolled emissions inventory estimated at 197 tpd by 95 percent. However, because of poor compliance rates, the reduction target remains elusive. Through successive amendments to EVR regulation and Rule 461, CARB and the District attempted to address this chronic problem.

Regulatory History

In an effort to significantly improve the compliance rates from this industry by monitoring emissions, the District in 2000 amended Rule 461 and significantly enhanced the monitoring of source testing requirements of this rule as well as its enforcement presence. The emission reduction from the 2000 amendment was estimated to be 27.3 tpd. While the compliance rates improved significantly, they are far from being satisfactory. Based on the current compliance status (75 percent), the remaining VOC emissions from GDF operations are estimated to be 17.3 tpd.

Presently, Rule 461 requires 95 percent control efficiency for both Phase I and Phase II vapor recovery systems. On April 2005, CARB requested the installation of EVR Phase I and Phase II on all GDFs. EVR is projected to increase the control efficiency of the vapor recovery systems from 95 percent to 98 percent.

Effective September 2005, CARB required all GDFs dispensing units to be compatible with the integral ORVR vapor recovery systems installed on late model motor vehicle.

PROPOSED METHOD OF CONTROL

The proposed control measure includes the following potential actions:

1. Improve the functions of the ISD to provide an earlier warning signal at a lower degradation rate which would indicate the potential for the failure thereby allowing preventative repairs prior to system failure. Currently, the warning alert starts after 25 percent degradation of performance of the vapor recovery system.

2. Change both the ISD warning and gross failure alerting ranges to approximate the CARB Executive Orders standards. For example, the Executive Order and the ISD ranges for the gross failure alert of the vapor/liquid (V/L) test are 0.95 – 1.15 and 0.24 – 2.01, respectively. Therefore, the ISD gross failure alerts starts after 75 percent degradation of performance of the vapor recovery system.

The preliminary results of CARB ISD field study which dated November 14, 2006 indicated that the malfunction criteria for both the warning and the gross failure modes can be tightened and provide earlier warning and gross failure alerts at lower degradation of performance rates.

3. Disallow the use of the ISD reset button unless and until all the defective components are repaired and the vapor recovery system operates in full compliance. Currently, the ISD system is equipped with a reset button, which allows a failed vapor recovery system to be reset to dispense gasoline without repair of the system. Additionally, staff is exploring with ISD's manufacturer the feasibility of restricting the ISD shut down function to the defective fueling point(s) instead of the current shut down function which includes all the fueling points.

4. Seek implementation of the CARB certified ISD systems on all the balance and the vacuum assist systems.

5. Install a "shut down" sensor or mechanism on the fuel line of the dispenser to stop fueling if the fuel filters are blocked and the fueling flow rate drops below the system certification standards. After the implementation of the ORVR requirement, the fuel filters integrity is essential to maintain the appropriate liquid flow rate (as specified by the CARB Executive Order). Partially blocked fuel filters decrease the fuel flow rates which deactivate the pressure sensor in the nozzles and allow air ingestion and vapor growth in the underground tanks. This method of control provides a feasible technology to verify compliance with the fuel flow rate standards of the Executive Order and assure the integrity of the vapor recovery system.

EMISSIONS REDUCTION

The estimated emission reductions are summarized in the control measure summary.

RULE COMPLIANCE

Compliance with this control measure would be similar to the compliance requirements under existing Rule 461.

TEST METHODS

The control measure will implement the EVR tests procedures: TP-201.3 (Leak Decay), TP-201.4 (Back Pressure), TP-201.5 (Vapor/liquid ratio A/L), and TP-201.6 (Liquid Removal).

COST EFFECTIVENESS

The cost effectiveness of this control measure is estimated at $1,673 per a ton of emission reduction.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations (Health and Safety Code §40001).

REFERENCES

"Retail Gasoline Dispensing Facility Inspection, Rule 461 Compliance Audit in the South Coast AQMD," Second Quarter 1997, South Coast Air Quality Management District.

"Emissions Inventory Procedural Manual Volume III Methods for Assessing Area Source Emissions," Section 4.10 – Gasoline Dispensing Facilities, October 1997, Air Resources Board.

South Coast Air Quality Management District, "Final Staff Report For Proposed Amended Rule 461 - Gasoline Transfer and Dispensing," April 21, 2000.

"Enhanced Vapor Recovery Technology Review," Monitoring and Laboratory Staff Report, California Air Resources Board, April 2002.

"Enhanced Vapor Recovery Update," Sixth Annual California Unified Program Conference, February 5, 2004.

FURTHER EMISSION REDUCTIONS FROM CUTBACK ASPHALTS [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ASPHALT PAVING		
CONTROL METHODS:	LIMITING USE OF CUTBACK ASPHALT		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce emissions from asphalt paving applications by limiting the use of cutback asphalt and/or replacing it with emulsified asphalt.

Background

Cutback and emulsified asphalts are used in nearly all paving applications. Cutback asphalt is prepared by blending (or "cutting back") asphalt cement with petroleum distillates such as gasoline, naphtha, kerosene, or slow volatile oils. Emulsified asphalt is made by blending asphalt cement with a majority of non-volatile emulsifying agent (e.g. water or soap) and some light petroleum distillates used as diluents. As a result, emulsifying asphalt has a lower emission potential than cutback asphalt. In 1977, EPA issued a Control Technology Guidelines (CTG) defining Reasonably Available Control Technology (RACT) for cutback asphalt and indicating that the use of emulsified asphalt in place of cutback asphalt would reduce almost all VOC emissions. EPA provided additional guidelines for cutback asphalts in its "Blue Book" 1) No CTG cutoff level; 2) seasonal exemptions (i.e. cutback asphalt is not recommended during ozone season) as opposed to limitation on temperature where paving is applied (e.g. less than 50 degree F); and 3) exemptions for use solely as penetrating prime coat and when stockpiled for extended period of time which is longer than 1 month.

Regulatory History

The District's Rule 1108 – Cutback Asphalt requires that no person shall sell, or offer for sale for use, or use medium or slow curing grade cutback asphalt containing more than 0.5% by volume organic compounds which evaporate at 260 degree C (or 500 degree F) or lower as measured by ASTM Method D402. The District's Rule 1108.1 – Emulsified Asphalt requires

that no person shall sell, or offer for sale for use, or use emulsified asphalt containing more than 3% by volume organic compounds which evaporate at 260 degree C (or 500 degree F) or lower as measured by ASTM Method D244. These rules do not contain seasonal exemptions or usage limitation as in EPA's RACT.

Many states, such as Maine (Regulation, Chapter 131), Missouri (Rule 10 CSR 10-5.310), New York (Rule 211, §211.4), Pennsylvania (Rule 129, §129.64), Rhode Island (Rule 25), have already adopted regulations to implement EPA's RACT to prohibit the use of cutback asphalt during ozone season (May to September). These states provide exemptions for cutback asphalts used as penetrating prime coat, long-life stockpiles, filling potholes, road patching, and dust palliative. In addition, Maine and Rhode Island also require that cutback asphalts contain less than 5% organic compounds which evaporate at 500 degree F, and New York requires that cutback asphalts must be applied only at low ambient temperatures, during other months of the year.

In California, Sacramento (Rule 453) and Placer County (Rule 217) limit the use of cutback asphalts throughout the entire year. Placer County allows the use of cutback asphalts solely during the months of the year when the National Weather Service forecasts that atmospheric temperatures for the 24-hour period following the application will not exceed 10 degree C (50 degree F), and Sacramento allows the use of cutback asphalts solely as prime coat.

As required by federal rule 40 CFR 51.912, the District developed and submitted to U.S. EPA a report to demonstrate that the current District rules and regulations fulfill the 8-hour ozone RACT. During this review, the EPA Region 9 noted that Rule 1108 does not contain RACT for asphalt paving (i.e. seasonal and usage exemptions), and therefore recommended staff to consider this option in the 2007 AQMP. In their RACT submittal to U.S. EPA, the District committed to evaluate the potential of limiting the use of cutback asphalt. This control measure is intended to fulfill this commitment.

PROPOSED METHOD OF CONTROL

The most effective way to control emissions from asphalt paving is to reduce the VOC content in cutback as well as emulsified asphalts. Another strategy is to prohibit the use of high VOC containing asphalts by using seasonal restrictions, or limit its use to certain applications. The District will continue further evaluation to determine the possibility of implementing these control options, as well as evaluating further controls.

EMISSIONS REDUCTION

The 2014 and 2023 baseline emissions estimated for asphalt paving are about 0.90 tons per day and 1.40 tons per day, respectively. At this time, it is not possible to quantify precise emission reductions from implementation of this control measure. However, prohibiting the use of cutback asphalt and replacing it with emulsified asphalt could potentially reduce 40% (or 0.5 tpd) of the VOC emissions from this category. Further analysis is needed to quantify accurate emission reductions from this control measure.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented, but would be similar to the compliance requirements under existing Rules 1108 and 1108.1.

TEST METHODS

The percent by volume organic compounds which evaporate at 500 degree F or lower) is determined based on ASTM Method D403 (AASHTO T78) for cutback asphalt, and ASTM Method D244 (AASHTO T59) for emulsified asphalt as specified in the District's Rule 1108 and 1108.1.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been specifically determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001).

REFERENCES

EPA, Control Technology Guidelines - Control of Volatile Organic Compounds from Use of Cutback Asphalt, EPA-450/2-77-037, December 1977.

EPA, EPA "Blue Book" - Issues Relating to VOC Regulations Cutpoints, Deficiencies, and Deviations – Cutback or Emulsified Asphalt, May 25, 1988

EPA, Comment letter from Andrew Steckel (EPA Region 9) to Joe Cassmassi (AQMD), 8-Hour Ozone Reasonably Available Control Technology – State Implementation Plan (RACT SIP) Analysis, June 28, 2006.

LADCO-Midwest RPO, Interim Paper – Midwest Regional Planning Organization (RPO) Candidate of Control Measures – Asphalt Paving, March 10, 2006.

New York State, Department of Environmental Conservation, Rules and Regulations, Part 211 – General Prohibitions, §211.4 – Volatile Organic Compounds Prohibited, 1983.

Maine, Department of Environmental Protection, Rules and Regulations, Chapter 131 – Cutback Asphalt and Emulsified Asphalt, 1993.

Missouri, Code of Regulation, 10 CSR 10-5.310, Liquefied Cutback Asphalt Restricted, 1988.

OTC, Summary of Ozone Transport Commission Candidate Control Measures – Asphalt Paving, March 27, 2006.

Pennsylvania, Code of Regulations, §129.64, Cutback Asphalt Paving, Amended 1983.

Placer County Air Pollution Control District, California, Rule 217 – Cutback and Emulsified Asphalt Paving Materials, Amended September 25, 1990.

Rhode Islands, Air Pollution Control Regulation, No. 25, Control of Volatile Organic Compound Emissions from Cutback and Emulsified Asphalt, February 2001.

Sacramento Metropolitan AQMD, California, Rule 453 - Cutback and Emulsified Asphalt Paving Materials, Amended August 31, 1982.

District, Rule 1108 – Cutback Asphalt, Amended February 1, 1985.

District, Rule 1108.1 – Emulsified Asphalt, Amended November 4, 1983.

District, Staff Report – AQMD 8-Hour Ozone Reasonably Available Control Technology (RACT) State Implementation Plan (SIP) Demonstration, June 2006.

FURTHER EMISSION REDUCTIONS FROM PIPELINE AND STORAGE TANK DEGASSING [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	PIPELINE AND STORAGE TANK DEGASSING		
CONTROL METHODS:	ENHANCED CONTROL TECHNOLOGY; INCREASED CONTROL EFFICIENCY; ESTABLISH CONCENTRATION LIMITS; EXPAND CURRENT RULE TO INCLUDE PIPELINES, OTHER SOURCE CATEGORIES, SMALLER TANKS SIZES AND OTHER DEGASSING OPERATIONS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	1.2 to 1.8	1.2 to 1.8	1.2 to 1.8
VOC REDUCTION		0.7 to 1.6	0.7 to 1.6
VOC REMAINING		0.2 to 0.5	0.2 to 0.5
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	1.2 to 1.8	1.2 to 1.8	1.2 to 1.8
VOC REDUCTION		0.7 to 1.6	0.7 to 1.6
VOC REMAINING		0.2 to 0.5	0.2 to 0.5
CONTROL COST:	$2,500 TO $22,900 PER TON OF VOC REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce emissions from pipeline and storage tank degassing by requiring enhanced control technology, increased control efficiency, establishing concentration limits, and expanding the source categories, operations and the capacity (size) of affected equipment.

Background

There are approximately 640 floating roof tanks and 750 fixed roof tanks storing petroleum products in refineries, bulk loading, and storage facilities, as well as 11,000 gasoline storage tanks at service stations throughout the Basin, all of which are subject to Rule 1149 – Storage Tank Cleaning and Degassing. Storage tanks must be degassed prior to cleaning, removal, and maintenance. These tanks and their associated piping require periodic cleaning to prevent contamination of the product. Ultimately, the tanks are replaced as they wear out. In addition, some tanks are taken out of service each year so that land can be put to alterative use. This control measure would impact the refineries, chemical plants, gasoline stations, and an unknown number of new facilities in the paint, solvent, adhesive, and ink manufacturing industries.

Regulatory History

Rule 1149 – Storage Tank Cleaning and Degassing was adopted on December 4, 1987, and amended on April 1, 1988 and July 14, 1995. Rule 1149 requires control of VOC emissions during the degassing process. Degassing is the process of removing organic gases from a tank for cleaning purposes. Subject to this rule are the following:

- Above-ground tanks having a capacity of more than 39,630 gallons storing organic liquid with a vapor pressure of more than 2.6 psi or between 19815 and 39,630 gallons having a vapor pressure of more than 3.9 psi.

- Underground tanks having a capacity of more than 500 gallons storing organic liquid with a vapor pressure of more than 3.9 psi.

This rule requires that specific volume(s) of displaced organic gas be vented to control devices that are at least 90 percent efficient for all affected facilities and the submittal of a compliance plan.

PROPOSED METHOD OF CONTROL

This control measure seeks to further reduce emissions from storage tank degassing by requiring enhanced control technology, increased control efficiency, establishing concentration limits for gases vented to the atmosphere. In addition, Rule 1149 could also be amended to regulate smaller tanks; other source categories, such as pipelines; other industries that manufacture or store paint, ink, adhesive, and solvent; and other degassing operations, such as those for repair or product switching, and not just those operations performed as part of tank cleaning.

EMISSIONS REDUCTION

The emissions inventory is estimated between 1.2 and 1.8 tons of VOC per day based on notification data and operational records. Emissions reductions are estimated to range between 0.7 and 1.6 tons of VOC per day depending on the concentration limit established and the vapor pressure of liquids applicable. Further analysis is needed to quantify accurate emission reductions from this control measure.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented, but would be similar to the compliance requirements under existing Rule 1149.

TEST METHODS

U.S. EPA Method 25 – Determination of Total Gaseous Non-methane Organic Emissions as Carbon;

U.S. EPA Method 25A - Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer; or

AQMD Test Method 25.1 - Determination of Total Gaseous Non-methane Organic Emissions as Carbon.

COST EFFECTIVENESS

The cost effectiveness of this control measure ranges between $2,500 per ton of VOC reduced to $22,900 depending on the concentration limit established and the vapor pressure of liquids applicable. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001).

REFERENCES

Bay Area Air Quality Management District Regulation 8, Rule 5 – Storage of Organic Liquids (November 27, 2002).

San Joaquin United Valley Air Pollution Control District Rule 4623 - Storage of Organic Liquids (May 19, 2005).

Ventura County Air Pollution Control District Rule 74.26 – Crude Oil Storage Tank Degassing Operations (November 8, 1994).

Ventura County Air Pollution Control District Rule 74.27 – Gasoline and ROC Liquid Storage Tank Degassing Operations (November 8, 1994).

South Coast Air Quality Management District Rule 1149 - Storage Tank Cleaning and Degassing (July 14, 1995).

GROUP 3

Combustion Sources

NO_X REDUCTIONS FROM NON-RECLAIM OVENS, DRYERS AND FURNACES [NO_X]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	FACILITIES WITH OVENS, DRYERS & FURNACES		
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NOX INVENTORY	4.9	6.2	6.8
NOX REDUCTION		3.5	3.8
NOX REMAINING		2.7	3.0
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NOX INVENTORY	5.3	6.6	7.3
NOX REDUCTION		3.7	4.1
NOX REMAINING		2.9	3.2
CONTROL COST:	$4,000 TO 13,000 PER TON NO_X REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

Boilers, process heaters, internal combustion engines and turbines are regulated by the District under source specific NOx rules. However, there is a wide variety of combustion equipment for which the District does not have source specific NOx rules. The equipment includes but is not limited to ovens, dryers, furnaces, kilns, afterburners and incinerators. The equipment is used in many industrial and commercial operations to dry, bake, cure, melt, burn off and form materials, or as VOC control devices.

Ovens, dryers and furnaces at non-RECLAIM facilities have NOx emission limits based on BACT/LAER requirements at the time the equipment was permitted. In addition, equipment exempt from permit requirements are not subject to NOx controls. However, technology is available to lower emissions from these units through retrofit of burners and controls or replacement with new equipment.

Regulatory History

In the 1994 and 1997 AQMP, control measure CMB-02 included reductions from a variety of non-RECLAIM combustion sources. Of the six components of the control measure, two have been implemented as District rules (CMB-02B – Small Boilers and Process Heaters and CMB-02F – IC Engines). The other components of CMB-02 proposed reductions from curing and drying ovens, metal melting furnaces, afterburners, and other miscellaneous combustion sources. In the 2003 AQMP these components of the control measure were delayed due to

administrative and technical issues. These categories are being reconsidered because technology has advanced and is more cost effective.

PROPOSED METHOD OF CONTROL

NOx emissions from these types of equipment can be reduced using low NOx burners. Many different types of burners have been developed to reduce NOx emissions from combustion sources. The principle technique involves premixing of fuel and air before combustion takes place. This results in a lower peak and more uniform flame temperature. A lower flame temperature reduces formation of NOx. Some premix burners also use staged combustion with a fuel rich zone to start combustion and stabilize the flame and a fuel lean zone to complete combustion and reduce the peak flame temperature.

Burners can also be designed to spread flames over a larger area to reduce hot spots and lower NOx emissions. Radiant premix burners with ceramic, sintered metal or metal fiber flame surfaces spread the flame, lower NOx emissions and produce more radiant heat. When a burner produces more radiant heat, it can also result in less heat escaping the equipment through exhaust gasses and an increase in efficiency.

Low NOx burners can significantly reduce emissions. Uncontrolled gas-fired ovens and dryers typically have NOx emissions on the order of 120 ppm. Ovens and dryers subject to BACT/LAER can have emission limits ranging from 60 ppm to less than 20 ppm. Uncontrolled high temperature furnaces and ovens can have NOx emissions greater than 150 ppm. High temperature furnaces that meet BACT/LAER can achieve NOx emissions as low as 60 ppm.

During the rulemaking process it may be assessed that reducing NOx emissions from this category is better suited by applying today's BACT as described in the 2007 AQMP control measure MCS-01 Facility Modernization.

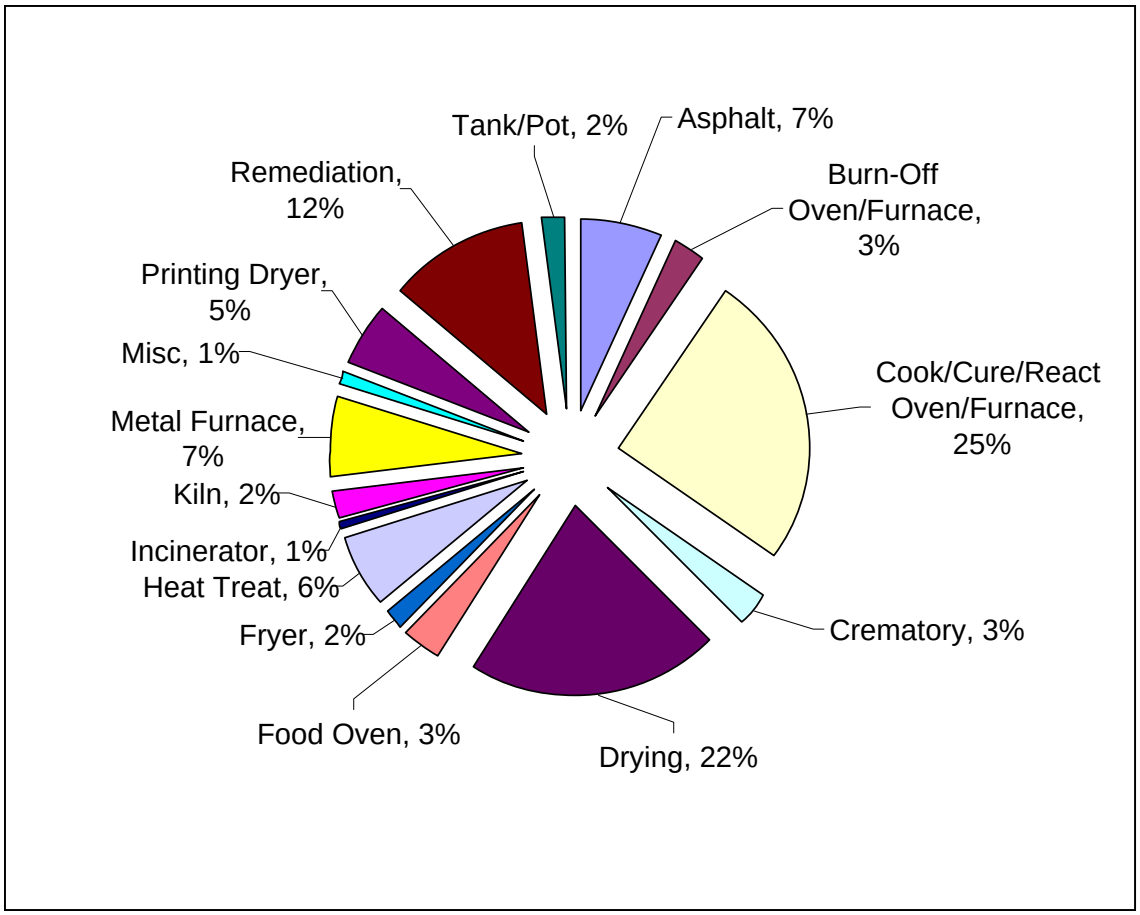
EMISSIONS REDUCTION

The current inventory for permitted equipment in these categories is estimated to be approximately 4.9 tons of NOx per day. Approximately 25 to 35% of this equipment is estimated to be permitted at current BACT. An estimate of the percent emissions associated with major categories of this type equipment is presented in Figure 1 based on District permit database. Reductions of 50 to 75% are achievable for the equipment which has not been subject to BACT. The estimated NOx emission reduction from requiring current BACT is therefore about 50 percent. It is anticipated that 3.5 tons per day of NOx emission reductions could be achieved by 2014 and 3.8 tons per day by 2023.

Additional reductions can be achieved by adopting emission limits for new ovens, dryers and furnaces that do not require a permit. These reductions can be achieved by requiring new equipment to be certified at lower emission levels as is required for small boilers and heaters subject to the District's Rule 1146.2.

FIGURE 1

NOx Emission Contribution of NOx Non-RECLAIM Equipment Categories



RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on source testing, permit requirements, monitoring, recordkeeping, and reporting requirements similar to those in other District rules regulating combustion sources. In addition, compliance would be verified through inspections.

COST EFFECTIVENESS

The cost effectiveness of retrofitting this type of equipment to meet best available retrofit control technology (BARCT) was analyzed for the January 2005 amendment to the NOx RECLAIM program. The cost effectiveness in that analysis varied from about $4,000 per ton of NOx reduced to $13,000 per ton. The typical cost effectiveness was around $10,000 per ton NOx reduced. This cost effectiveness is also within the range of cost effectiveness in the January 2005 amendment for RECLAIM boilers and process heaters to meet BARCT. It is also in the range of cost effectiveness for small boilers and heaters to meet 20 ppm (Rule 1146.2).

The cost effectiveness for this equipment to meet BARCT would be similar to these costs. In addition, in many cases, BACT and BARCT are the same.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

1994 AQMP Appendix IV-A

1997 AQMP Appendix IV-A

2003 AQMP Appendix IV-A

AQMD, Staff Report for Proposed Amended Rule 1121, December 1999.

AQMD, Staff Report for Proposed Amendments to Regulation XX - Regional Clean Air Incentives Market (RECLAIM), January 2005

AQMD, Staff Report for Proposed Amended Rule 1146.2, May 2006.

FURTHER SO_X REDUCTIONS FOR RECLAIM [SO_X]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	SO_X RECLAIM FACILITIES		
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
SO_X INVENTORY	11.7	11.7	11.8
SO_X REDUCTION		2.9	2.9
SO_X REMAINING		8.8	8.9
CONTROL COST:	BETWEEN $10,100 AND $16,000 PER TON SO_X REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

As of the end of the 2004 compliance year, there were approximately 33 SOx facilities in the Regional Clean Air Incentives Market (RECLAIM) Program. The RECLAIM program includes facilities with SOx emissions greater than or equal to four tons per year in 1990 or any subsequent year. SOx facilities in the RECLAIM program have a wide range of equipment such as Fluidized Catalytic Cracking Units (FCCU), furnaces, internal combustion engines, boilers, incinerators, dryers, kilns, afterburners, heaters, and gas turbines.

This control measure identifies a series of control approaches that would be implemented as part of Best Available Retrofit Control Technology (BARCT) for the SOx RECLAIM program. Depending on the control strategy implemented, this control measure may affect all SOx RECLAIM facilities or a portion of the facilities based on their annual emissions or the type of equipment at the facility.

Background

Under the RECLAIM program, facilities are issued SOx (and NOx) allocations. SOx allocations decline annually until 2003, and remain constant thereafter. To meet their annual allocation, facilities have the option of installing pollution control equipment, changing operations, or purchasing RECLAIM Trading Credits (RTCs).

Additional emission reductions from RECLAIM may be needed to meet the federal "as expeditiously as practicable" and the state "all feasible measures" requirements. When the RECLAIM program was adopted, it was designed to achieve a Best Available Retrofit Control Technology (BARCT) level of emission reductions. As BARCT is updated to reflect improvements in pollution control equipment, additional reductions from the RECLAIM program may be possible.

Regulatory History

On October 15, 1993, the District's Governing Board adopted the RECLAIM program. Regulation XX – RECLAIM includes 11 rules that specify the applicability, allocations, definitions, requirements, and monitoring, reporting, and recordkeeping requirements. When the RECLAIM program was adopted, it originally included 41 SOx and 392 NOx commercial and industrial facilities. Since the adoption of RECLAIM, there have been a number of amendments to the RECLAIM rules.

The California Clean Air Act (CCAA) requires districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures Health and Safety (H&S) Code (H&S §§40913, 40914, and 40920.5). The term "feasible" is defined in the 14 California Code of Regulations, section 15364, as a measure "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." The required use of BARCT for existing stationary sources is one of the specified feasible measures. H&S Code §40440 (b)(1) requires the District to adopt rules requiring best available retrofit control technology for existing sources. H&S Code §40406 specifically defines BARCT as "…best available retrofit technology means an emission limitation that is based on the maximum degree of reduction achievable taking into account environmental, energy, and economic impacts by each class or category of source."

In RECLAIM, these emission limits are converted into mass emission limitations utilizing activity levels. BARCT for each category of equipment takes into account the range of types and size of equipment in each category.

Applicable RECLAIM Task Force recommendations would be incorporated during the rulemaking process.

PROPOSED METHOD OF CONTROL

As of the end of the 2004 compliance year, there were approximately 36 SOx facilities in the Regional Clean Air Incentives Market (RECLAIM) Program. The RECLAIM program includes facilities with SOx emissions greater than or equal to four tons per year in 1990 or any subsequent year. SOx facilities in the RECLAIM program have a wide range of equipment such as FCCUs, asphalt blowing, boilers, heater and sour gas treating units.

Refinery gas fueled process heaters and external combustion boilers and fluidized catalytic cracking units (FCCUs) account for over half of SOx RECLAIM emissions and could potentially be sources for further reductions.

The primary purpose of reducing the SOx RECLAIM ending allocations is to meet the state law best available retrofit control technology (BARCT) equivalency requirements. Potential BARCT evaluation includes evaluating the maximum degree of reduction achievable with current control technologies in relation to environmental, energy, and economic impacts by each class or category of source. Advancements in control technologies require a re-evaluation of current BARCT. A re-evaluation of BARCT would require updated control technology assessments for permitted equipment at RECLAIM facilities. An example of this possible re-

evaluation involves the reduction of sulfur in refinery gas to reduce SOx emissions from the combustion of the refinery gas.

Compounds have been developed that are added to the catalyst in the regenerator of fluidized catalytic cracking units that drive a series chemical reactions that create H2S from the sulfur released from the feed stock. The H2S can be removed from the process stream as elemental sulfur. This reduces the amount of sulfur available to create SOx pollutants. As fluidized catalytic cracking units are the largest source of SOx emissions in RECLAIM, the use of sulfur reducing compounds will result in a large reduction of SOx emissions. Furthermore, although SOx sources are required to burn 15 ppmv sulfur content diesel fuel via Rule 431.2, ending allocation has not been reduced to reflect such requirements.

During the rulemaking process, staff will also explore the feasibility to incorporate the control concept of Control Measure MCS-01 Facility Modernization to achieve reductions beyond 2014.

Reduce Existing Ending Allocations

Under the RECLAIM program, initial SOx allocations decline annually through the year 2003 and remain constant after 2003. This control option would seek further reductions in allocations from 2010 through 2014 and remain constant after 2014. Such reduction in allocations can be across-the-board shaving or source-specific. Similar to the existing RECLAIM program, facilities have the following options to meet their allocation: install pollution control equipment, process or other changes, or purchase RTCs.

EMISSIONS REDUCTION

Implementation of this measure is designed to achieve BARCT for sources subject to the following rules:

1) Rule 431.1 – Sulfur Content of Gaseous Fuels; and

2) Rule 1105 – Fluid Catalytic Cracking Units – Oxides of Sulfur.

In addition, this measure would implement BARCT not yet incorporated in the ending allocation (e.g., Rule 431.2).

Estimated SOx emissions reduction from reduction of sulfur concentration in refinery gas burned is approximately 1.56 tons per day.

Estimated SOx emissions reduction from FCCUs is approximately 1.28 tons per day.

Along with low sulfur diesel fuel applications, it is estimated at this time that approximately 2.9 tons per day of SOx reductions could be achieved from the RECLAIM program. It should be noted that during rule development all SOx sources in RECLAIM will be subject to a thorough BARCT evaluation to achieve the maximum feasible SOx reductions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Two major sources of RECLAIM SOx emissions that have been identified as possible areas of emission reductions are refinery gas fueled process heaters and external combustion boilers and FCCUs. Exact equipment and material costs are very difficult to obtain due to the uniqueness of the processes of each refinery subject to the RECLAIM program. Therefore, cost effectiveness numbers are difficult to calculate and are, by necessity, broad estimates. The estimated average cost effectiveness for SOx reductions achieved through reducing refinery gas sulfur content is approximately $10,100 per ton SOx reduced. The estimated average cost effectiveness for SOx reductions achieved through the use of FCCU catalyst additives is approximately $16,000 per ton SOx reduced.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

FURTHER NOX REDUCTIONS FROM SPACE HEATERS [NO_X]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	NATURAL GAS FIRED FAN-TYPE FURNACES		
CONTROL METHODS:	LOW NOX BURNERS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NOX INVENTORY	9.7	10.5	11.1
NOX REDUCTION		0.8	3.3
NOX REMAINING		9.7	7.8
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NOX INVENTORY	3.4	3.6	3.8
NOX REDUCTION		0.3	1.2
NOX REMAINING		3.3	2.6
CONTROL COST:	$10,000 PER TON NO_X REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

Natural gas fired fan-type central furnaces are used in residential and commercial buildings to provide comfort heating. Most single family homes and many multiunit residences in the South Coast Air Quality Management District (District) have this type of heating equipment. Many older homes, with below floor furnaces, have been retrofitted with this type of forced air heaters. Typically, residential units have burners rated between 50,000 and 175,000 British thermal units per hour (Btu/hr). Since 1984, this equipment has been regulated by the District Rule 1111 – NOx Emissions from Natural Gas-Fired, Fan type Central Furnaces.

Regulatory History

Rule 1111 was first adopted by the District Governing Board in December 1978 and amended in July 1983. The rule regulates natural gas fired fan-type central furnaces with an input rate of less than 175,000 Btu/hr. The NOx emission limit in the rule is 40 nanograms/joule (ng/J) of heat delivered to the heated space (heat output). As required by Rule 1111, the manufacturer must obtain certification of each furnace model based on source testing conducted in accordance with the test methods approved by the District.

PROPOSED METHOD OF CONTROL

NOx emissions from these types of equipment can be controlled with low NOx burners. Other combustion equipment with similarly sized burners can achieve NOx levels as low as 15 to 20 ppm (10 to 14 ng/J). The current Rule 1111 requires natural gas fired fan-type central furnaces to meet a NOx emission limit of 40 ng/J heat output. Also, this is the current NOx emission

limit under the District Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters) for boilers and water heaters rated up to 400,000 Btu/hr. The future limit for these small boilers in the year 2012 is 20 ppm or 14 ng/J heat output. The current limit for residential tank-type water heaters rated less than 75,000 Btu/hr per Rule 1121 (Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired water Heaters) is 15 ppm or 10 ng/J heat output.

To achieve NOx emission levels of 30 ppm (20 ng/J) or less from the central furnaces may require the use of power premix burners in the higher heat input range, and atmospheric premix burners in the lower heat input range.

Another control strategy available for NOx reduction is the use of heat pumps for space heating which do not burn natural gas, and are often used in moderate climates. This technology may be promoted through an incentive program or by regulation.

EMISSIONS REDUCTION

Technology exists to achieve NOx emission levels of 15 to 30 ppm (10 to 20 ng/J) from burners in this size range. The current emission limit is 40 ng/J; emission reductions of 50% to 75% are possible from this source category. It is anticipated that this emission limit will be implemented starting 2012. If necessary, reductions could be phased in by equipment category. Assuming a 50% reduction (from 40 to 20 ng/J), a reduction of 3.3 tons/day NOx emissions could be achieved by the year 2023 from the baseline year 2002 annual average inventory of 9.7 tons/day. Additional reductions from 2010 through 2023 are possible through incentive programs for homeowners to purchase low NOx furnaces before the end of the useful life of their existing furnace.

During the rulemaking phase, staff intends to form a working group comprised of equipment vendors and other interested parties. The working group will assist in the technology assessment and in establishing emission limits and an appropriate implementation schedule for the rule.

Additional emission reductions will be achieved if residential type furnaces must meet proposed higher efficiency standards under consideration by the U.S. Department of Energy. The current proposed standard would result in a fuel savings of up to 2.5% for an individual unit and lower NOx emissions. The contribution to emission reductions of this proposed regulation will be evaluated as part of rule development.

RULE COMPLIANCE AND TEST METHODS

Manufacturers are responsible for ensuring that the equipment meets the emission limit. Compliance is determined by testing each appliance model using test methods and procedures approved by the District. Test results are reviewed for approval by the District.

COST EFFECTIVENESS

At the present time, there are no heating furnaces with NOx emissions significantly below the 40 ng/J standard in the District Rule 1111. A review of the emissions test data for Rule 1111 compliance indicates that typical emissions range from 30 to 40 ng/J. However, cost effectiveness analyses have been performed for similarly sized burners (less than 175,000 BTU/hr) in other equipment regulated by the District.

Based on the cost effectiveness of power premixed burners to reduce emissions from 40 ng/J to 20 ng/J in small boilers and water heaters (100,000 to 300,000 Btu/hr), subject to the District Rule 1146.2, the cost effectiveness of meeting 20 ng/J or 30 ppm for this control measure is estimated to be up to $12,500 per ton of NOx reduced. The cost effectiveness to meet 14 ng/J (20 ppm) for the same units was estimated to be up to $10,000 per ton of NOx reduced. In a similar analysis for the District Rule 1121, the cost effectiveness to reduce NOx emissions from 40 ng/J to 10 ng/J for premixed atmospheric radiant burners, in the size range of 30,000 to 50,000 Btu/hr used in residential tank-type water heaters, was estimated to be $16,000 per ton of NOx reduced.

The cost effectiveness for fan-type central furnaces should be lower than for small boilers and water heaters since the expected life of a central furnace is more than for tank-type water heaters and small boilers. More emission reductions would be achieved for the same cost. Most manufacturers provide a 20 year warranty on the heat exchanger of the furnace. In the cost effectiveness analyses for Rule 1146.2, the lifetime of small boilers was assumed to be 15 years. A tank type water heater has a shorter lifetime of 10 years.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

SCAQMD, Staff Report for Proposed Amended Rule 1121, December 1999.

SCAQMD, 2003 AQMP Appendix III, Base and Future Year Emissions Inventories, August 2003.

SCAQMD, Staff Report for Proposed Amended Rule 1146.2, May 2006.

CEC (California Energy Commission), California Statewide Residential Appliance Saturation Study, June 2004.

NATURAL GAS FUEL SPECIFICATIONS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	NATURAL GAS FUEL COMBUSTION (STATIONARY SOURCES)
CONTROL METHODS:	FUEL SPECIFICATIONS
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to minimize potential future emission increases from the combustion of natural gas in stationary applications.

Background

Natural gas is a combustible, gaseous mixture composed primarily of methane (CH4), with lesser amounts of ethane (C2H6), propane (C3H8), other heavier hydrocarbons, oxygen and inert compounds such as carbon dioxide and nitrogen. The composition of natural gas varies by source. The table below compares the natural gas characteristics of the current system average for Southern California Gas Company (SoCalGas), California-produced natural gas, and potentially available LNG derived supplies that may be imported in the future, and the SoCalGas gas quality tariff.

	System Average*	California Production**	Potential LNG Imports***	Revised Rule 30 Tariff
Higher Heating Value, (Btu/scf)	1033	993-1150	1063-1166	990-1150
Wobbe Index, (Btu/scf)	1341	1289-1424	1373-1446	1279-1385
Carbon Dioxide, (% by Volume)	1.3%	0.00-3.00%	Trace	3%
Oxygen, (% by Volume)	Trace	Trace	Trace	0-.2%
Total Inerts, (% by Volume)	1.7%	0.34-4.00%	Trace	4%
Methane, (% by Volume)	95.4%	82-99%	84-99%	-
Ethane, (% by Volume)	2.3%	0.00-11%	0.06-13.2%	-
Propane, (% by Volume)	0.8%	0.1-4.8%	0.4-4.0%	-
Butane+, (% by Volume)	Trace	Trace -3.5%	Trace – 2.3%	-

* System weighted average since 1997. The majority of SoCalGas gas supply is from out of State with about 20% of the supplies coming from the Rocky Mountain area. Supplies from the Rocky Mountains currently have a WI of about 1370.

** California production is about 12-14% of the gas supply mix in southern California. Less than 1% of the California supplies are produced within the District.

*** Gas quality characteristics of potentially available LNG supplies at the source.

The natural gas currently supplied within the District on a weighted average, is 1033 Btu/SCF higher heating value (HHV) and 1341 Wobbe Index (WI). Data from SoCalGas for the five year period from 2000-2004 show that the WI in the District has been less than 1360. In counties north of the District, where local gas production is significant, the average gas has a higher HHV and WI than in the District. In Santa Barbara and Kern Counties, the WI ranged as high as 1407 to 1429.

The increasing demand for natural gas indicates that there is a need for importation of Liquefied Natural Gas (LNG) from foreign countries. One LNG terminal is under construction in Baja California, and several more are proposed, that will bring LNG to Southern California. Introducing LNG which contains higher concentrations of heavier hydrocarbon components into the distribution system will result in a different mixture of gas quality than traditional supplies. The change in gas quality will directly affect air quality and performance of the machinery and end-user appliances. The effect would depend on the type of burner and how the device was tuned to its previous gas supply. Studies have shown that some combustion devices are relatively insensitive to changes in gas quality, while others can have increased NOx, CO and soot emissions. Sensitive devices include appliances with closed combustion chambers (i.e. ovens), low-NOx boilers with lean premix burners, microturbines, lean-burn natural gas engines, and large gas turbines with dry low-NOx combustors. Sensitive devices can have NOx emission increases from 20 to over 100% with hot gas. Appropriate tuning may reduce the emissions increase.

The Natural Gas Council's Interchangeability Work Group's white paper provides a good discussion of natural gas interchangeability, and identifies the needed research to address the unknowns with gas quality, particularly with industrial combustion equipment where little testing has been done. It found that WI was an effective screening tool for interchangeability, but alone is not sufficient to adequately predict all combustion phenomena. As an interim approach, it recommends that new gas supplies should not exceed the local historical average WI by more than ±4.0% and a maximum WI of 1400, maximum HHV of 1100, and maximum gas composition limits of 1.5% butane+ and 4% total inerts, unless there is testing or other historical experience that would support a wider range. SoCalGas sponsored studies covering residential appliances, small commercial/industrial equipment, natural gas vehicles and internal combustion engines. Further studies are being conducted by the California Energy Commission at Gas Technology Institute - Large Commercial/Industrial Burner Study and at Lawrence Berkeley Laboratory - Gas Interchangeability Study for Residential Appliances. This work, which will be completed over the next 2 years, will be helpful to assess the impact of potential gas quality changes. GE and Siemens Westinghouse have indicated work is in progress on effectively handling changes in gas quality for large turbines.

Regulatory History

The California Public Utilities Commission (CPUC) regulates gas quality for the public utilities through a series of rules and tariffs including PG&E Rule 21 and SoCalGas and SDG&E Rule 30. General Order 58 has standards for the hydrogen sulfide and total sulfide content of gas (0.25 grain/100 scf and 5 grains/100 scf, respectively) but does not contain standards for HHV or WI.

SoCalGas Rule 30 applies to "customer-owned gas" and has gas quality specifications for HHV, WI, moisture content, hydrogen sulfide, mercaptan sulfur, total sulfur, carbon dioxide, oxygen, inerts, and hydrocarbons and other properties. Prior to the recent CPUC decision, Rule 30 allowed a wide range of HHV (970-1150) and a wide range of WI (approximately 1270 – 1437).

In 2004 the CPUC initiated Rulemaking 04-01-025 to address the sufficiency of natural gas supplies and infrastructure in California. In Phase 2 proceeding of Rulemaking 04-01-025, SoCalGas proposed to limit the WI to a range of 1290 to 1400. The District recommended a maximum WI for new large gas supplies of 1360 in order to reduce potential emission impacts. The CPUC issued a final decision in September 2006. In general, the CPUC directed SoCalGas to file a revised Rule 30 tariff that contains the following specifications: minimum WI of 1279, maximum WI of 1385, minimum HHV of 990, maximum HHV of 1150, maximum carbon dioxide content of 3%, and maximum oxygen content of 0.2%. Because there are existing suppliers in California that do not meet these specifications, the CPUC is allowing a deviation process to grandfather in these existing supplies. The CPUC also directed SoCalGas to post real-time information on the WI of gas at identified points in the pipeline system on an electronic bulletin board. SoCalGas has added 15 WI monitoring points that are accessible through the internet.

District Rule 431.1 - Sulfur Content of Gaseous Fuels, limits the sulfur compound content of natural gas (calculated as hydrogen sulfide) to a maximum of 16 parts per million by volume. The District does not currently regulate the other properties of natural gas. The District has rules that regulate the emissions from combustion of natural gas from various types of equipment such as RECLAIM, Rule 1146, 1146.1, 1146.2, 1110.2, 1121 etc.

PROPOSED METHOD OF CONTROL

This control measure proposes to develop a two-component District regulation. The first component will include monitoring and testing of natural gas supplies to enhance quantification of emission changes attributable to gas quality higher than a Wobbe Index of 1360. Additional studies will also be conducted to further refine emission factors by equipment type. The District will also work with stakeholders to assess emission impacts based on the data collected during this phase of rule implementation. The second component will include a Wobbe Index of 1360 or equivalent mechanism/parameter and establish mitigation measures that would mitigate any emission increases, identified above, in the same time frame. Options for natural gas suppliers to achieve the objective of this control strategy could include, but are not limited to, 1) Importing a high-methane LNG, such as the 99+% methane gas proposed by BHP Billiton; 2) Removing the more complex hydrocarbons by condensing processes; 3) Adding inert gases like nitrogen, and/or 4) Blending natural gas from different sources where feasible, so that the

supply will not exceed a WI of 1360 or equivalent mechanism/parameter in the South Coast AQMD.

EMISSIONS REDUCTION

Projected emission reductions are uncertain at this time, and require further analysis. The control measure may only reduce future emission increases rather than provide emission reductions.

SoCalGas estimated that importing 1.0 bcf/day of CNG could increase NOx emissions in the District by 1.2 tons per day. There are not adequate data to support this estimate. The increase could be higher because 1) studies underway and sponsored by the California Energy Commission at the Gas Technology Institute may find that there are emission imports from natural gas used by industrial burners; 2) imported LNG could potentially replace all of the current low-WI interstate gas; 3) only a small number of units were tested in each equipment category by the SoCalGas test program; 4) the SoCalGas analysis assumed all industrial equipment would be readjusted to hotter gas and ignored the effects of frequent changes in gas quality.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented.

TEST METHODS

The appropriate testing methods are uncertain at this time and would require further analysis.

COST EFFECTIVENESS

Not Determined

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001), and may need to seek additional legislation to implement this control measure.

REFERENCES

California Public Utilities Commission, General Order 58-A: Standards for Gas Service in the State of California, April 1989.

California Public Utilities Commission, Phase 2 of Rule 04-01-025, Proposed Decision of Administrative Law Judges' Ruling on Rule 04-01-025 Phase 2 Order Addressing Infrastructure Adequacy & Slack Capacity, Interconnection & Operational Balancing Agreements, An Infrastructure Working Group, Natural Gas Supply and Infrastructure Adequacy For Electric Generators, Natural Gas Quality and Other Matters, August 8, 2006.

Natural Gas Council Interchangeability Work Group, "White Paper on Natural Gas Interchangeability and Non-Combustion End Use", February 28, 2005

SCAQMD, "Effects of Hot Gas on Stationary Source Emissions," Presentation to CAPCOA Mobile Source and Fuels Subcommittee, January 2003.

Southern California Gas Company, "Final Report – Gas Quality and Liquefied Natural Gas Research Study", April 2005

Southern California Gas Company, CPUC Rule 30, Transportation of Customer-Owned Gas, 1998-2003.

Responsive Testimony of South Coast Air Quality Management District to Testimony and Proposal of San Diego Gas and Electric Company and Southern California Gas Company, Barry Wallerstein, CPUC Case R.04-01-025, September 23, 2005.

Opening Brief of South Coast Air Quality Management District, CPUC Case R.04-01-025, January 18, 2006.

Proposed Rebuttal Testimony of Joseph Hower, San Diego Gas & Electric Company and Southern California Gas Company, CPUC Case R.04-01-025, November 30, 2005.

GROUP 4

PM Sources

PM CONTROL DEVICES (BAGHOUSES, WET SCRUBBERS, ELECTROSTATIC PRECIPITATORS, AND OTHER DEVICES) [PM]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	PM CONTROL DEVICES
CONTROL METHODS:	FABRIC OR OTHER FILTRATION DEVICES
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Baghouses are air pollution control devices that filter out small particles on the surface of fabric bags in a contained unit. This measure would strengthen existing regulatory requirements for baghouses to improve overall control efficiency by establishing stricter emission standards, automatic monitoring systems to ensure proper operation, and standard operating and maintenance procedures. Where applicable, other control devices designed to control PM emission, including wet scrubbers and electric precipitators could be implemented

Background

District rules establish particulate matter emissions limits and visible opacity standards that may be achieved with baghouse control equipment. Baghouses are considered by the District as the Best Available Control Technology (BACT) to effectively reduce particulate emissions. Currently two District rules require baghouses to be equipped with automatic leak detection systems; Rule 1156 – PM10 Emission Reductions from Cement Manufacturing Facilities, and Rule 1407 – Control of Emissions of Arsenic, Cadmium, and Nickel and Non-ferrous Metal Melting Operations. This measure would expand the requirement for Bag Leak Detection Systems to new and amended rules that rely on baghouses as particulate matter control devices. Electric precipitators or wet scrubbers might also be employed to reduce PM emissions from various operations.

Regulatory History

Historically, for almost 20 years (1988), baghouses have been designated BACT for controlling PM. Retrofit technology has advanced making high control efficiency possible. These improved retrofit requirements have begun to be implemented in District rules. For example, in the rule development process for Rule 1156, District staff received several comments from the public and baghouse vendors regarding the monitoring requirements for baghouses. Baghouse manufacturers strongly recommended that the District include a requirement for Bag Leak Detection Systems that would benefit the industry by allowing equipment operators to predict and detect bag failure before it occurs. Specifically, recommendations were made to include operation and maintenance procedures for baghouses to ensure that the performance of the baghouse is verified when the equipment is tested and maintained continuously. These procedures contain technical requirements required by the U.S. EPA's Maximum Achievable

Control Technology (MACT) for National Emission Standards for Hazardous Air Pollutants (NESHAPS) for the Portland Cement Manufacturing Industry (40 CFR Part 63, Subpart LLL, §63.1350). The NESHAPs implement the federal Clean Air Act by requiring all major sources to meet emission standards for hazardous air pollutants reflecting application of the MACT. Rule 1156 also has required O&M procedures and incentivizes the use of EPA verified filtration products by less frequent source testing and record keeping requirements.

PROPOSED METHOD OF CONTROL

Description of Control Opportunities

- Specify opacity standards for PM control devices (e.g., 20%)
- Specify PM emission standards for PM control devices based on outlet concentrations (e.g., 0.01 gr/dscf PM for existing control equipment and 0.005 gr/dscf for new control equipment).
- Require enclosure of process equipment (i.e., aggregate processing) and conveyors.
- Require use of EPA-approved high-efficiency baghouse filters.
- Specify performance standards for ventilation and hood systems
- Require operators of PM control devices to monitor, record and report (MRR) pertinent operating parameters of the air pollution control device to ensure continuous compliance with the emission standards, and install and operate Continuous Opacity Monitor System (COMS) or Bag Leak Detection System (BLDS) for top process emitters
- Require operators of PM control devices to establish operating and maintenance procedures, coupled with regular source testing to ensure proper equipment operation.

EMISSIONS REDUCTION

An additional 30 to 50 percent emission reductions are feasible for existing equipment/processes equipped with PM control devices using the above noted control techniques and operating practice standards. Properly operated and maintained baghouses are extremely efficient air pollution control devices, but they may be very ineffective if dust cake is allowed to accumulate on the surface of the bags or the fabric is torn. This measure seeks to improve the operation and maintenance of baghouses by requiring an automated alarm system (COMS or BLDS) to be installed to minimize the release of excess particulate matter during upset conditions that follow equipment malfunction or failure. In the event the alarm is triggered, corrective action procedures could include a shutdown of the process producing the particulate emissions or a specific section of the baghouse itself, depending on its size. Corrective actions may be more stringent for baghouses controlling toxic particulate matter emissions. This is the benefit of requiring established operating and maintenance procedures.

RULE COMPLIANCE

Develop a new rule with a schedule of compliance based on size rating. Require retrofitting for existing PM sources (BARCT) and control new equipment based on outlet concentrations. Compliance with this measure would be based on monitoring, recordkeeping and reporting requirements established in other District rules (e.g., Rule 1156) and would take into account a schedule of compliance based on size rating and outlet concentration, etc.

TEST METHODS

BLDS or COMS would be required as indicators of fabric filter performance. The equipment operator should follow EPA's Fabric Filter Bag Leak Detection Guidance, and Industrial Ventilation Handbook, for proper set up procedures, system operation principles, and quality assurance. In addition, EPA has verified filtration products that have demonstrated high performance under specific operational conditions.

COST EFFECTIVENESS

The cost of a typically BLDS ranges from about $5,000 to $9,000. The system cost will approach $6,000 to $12,000 if it is equipped with a data logger. COMS will range from $20,000 to $25,000 per monitor. Manufactures indicate the initial costs may be quickly recovered within a year or two because the system reduces employee-related costs associated with equipment monitoring, and the fact that overall equipment performance is improved which may double the life of fabric bags.

- High efficiency filter bags can cost upwards of twice that of conventional bags.
- The cost of source tests can vary, but typically cost $3,000 to $5,000, but can cost more depending on the complexity of the equipment or process.
- Covered or enclosed conveyors can cost from $100 to $1,000 per foot.

IMPLEMENTING AGENCY

The District has the authority to implement this measure.

REFERENCES

South Coast Air Quality Management District Rule 1156 - PM10 Emission Reductions from Cement Manufacturing Facilities, final staff report November 2005.

PM EMISSION HOT SPOTS – LOCALIZED CONTROL PROGRAMS [PM]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	PM HOT SPOTS
CONTROL METHODS:	ALL PM REDUCTION METHODS FEASIBLE
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The Basin covers a large geographic territory. The natural consequence of its size is that not all areas of the Basin are at the same stage of economic development. Locations with economic development as a result of increased construction activity may be prone to significantly higher levels of particulate matter as compared to the broader surrounding area. For example, the highest levels of PM10 concentrations are measured at the District's monitoring station in Rubidoux and nearby Mira Loma, which are currently undergoing a significant redevelopment effort.

Background

The District has not attained the annual average federal PM10 and PM2.5 standards. U.S. EPA revoked the annual federal PM10 standard on September 21, 2006. However, to ensure progress toward PM2.5 standards (a subset of PM10) and to address community PM exposure, this measure will continue to be pursued. While the District has made great progress in reducing PM concentrations Basinwide, certain areas have been proven to be more challenging than others in achieving the necessary reductions of PM concentrations that are deemed as PM "Hot Spots". One such area is western Riverside County which was the only area out of attainment for the federal PM10 standard. Primary contributors to those high levels, which currently exceed federally established threshold levels, are sources of crustal material (better known as entrained fugitive dust). The area of the Rubidoux monitoring station is a rural area with unstabilized vacant lots, many roads have unimproved road shoulders and are thereby not subject to street sweeping, and some roads and residential parking areas are unpaved. In addition, Mira Loma has had a large industrial build-up in recent years with a sizeable increase in heavy-duty truck traffic. Trucks are known to be parked on unpaved surfaces when not in use. This control measure would establish a localized program to supplement the regional approach to address PM hot spots through a cooperative effort with local agencies to reduce emissions from direct sources of PM. Sources of funding will be sought to aid in achieving the reductions, particularly for residents and private property owners. Any success and lessons learned in addressing the high PM10 emissions in the Rubidoux area will be used in addressing any PM hot spots in other areas of the Basin.

Regulatory History

The District has enacted a number of rules to address the issue of PM emissions for the past 30 years. In addition to developing and implementing programs to reduce fugitive dust from a variety of different sources, recently, measures have been taken to address the PM emissions associated with diesel emissions. Overall, the difficulty in attaining the PM standards may be attributed to the geographical nature of the Basin with PM emissions coming not just from combustion sources and other anthropogenic activities but also the ocean spray and desert environment that are part of Southern California and can be complicated by the fact that certain areas undergoing significant economic development are subject to higher particulate emissions due to the increased construction activity. The District has examined and implemented localized programs, such as the Ports initiatives and railroad rules to address localized PM "Hot Spots".

PROPOSED METHOD OF CONTROL

In the case of fugitive dust, control opportunities could include one or more of the following:

- Require fencing to inhibit dumping, and require mowing for weed abatement, pursuant to Rule 403 to create stabilized surfaces that minimize wind-blown dust;
- Clean-out existing curbs and mandate street-sweeping; and
- Encourage residents with dirt driveways to cover them with gravel or otherwise stabilize the surface.

Implementation of these measures could be executed through cooperative efforts, wherein the District and local governments would work together each under their own authority to maximize dust control efforts. In addition, this measure would enhance the District's enforcement presence to ensure compliance with air quality requirements and support Off-highway Vehicle (OHV) ordnance enforcement. Also, the District would work with economic development agencies to expedite construction activities directly affecting fugitive dust sources, including paving of roads and parking areas, curb/gutter and sidewalk installation where needed, and where not feasible for sidewalks, install landscaping.

Areas where combustion sources are the major contributors might reduce emissions through implementation of the Control Measure for PM Control Devices (Baghouses/wet scrubbers/electrostatic precipitators). The Goods Movement in Port Plan is an example of addressing a PM Hot Spots through the implementation of a variety of coordinated efforts.

EMISSIONS REDUCTION

Not Determined.

RULE COMPLIANCE

To Be Determined

COST EFFECTIVENESS

The cost-effectiveness of this control measure has not yet been determined. The District will continue to analyze the potential cost impacts associated with implementing this control measure and will provide specific cost-effectiveness as it becomes available.

IMPLEMENTING AGENCY

The District has authority to implement this measure.

EMISSION REDUCTIONS FROM WOOD BURNING FIREPLACES AND WOOD STOVES [PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	RESIDENTIAL WOOD COMBUSTION		
CONTROL METHODS:	LOW EMISSION STANDARDS, INCENTIVE PROGRAMS, SMOKE MANAGEMENT PLAN (VOLUNTARY CURTAILMENT), AND PUBLIC OUTREACH		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	5.8	6.5	7.0
PM2.5 REDUCTION		1.0	1.6
PM2.5 REMAINING		5.5	5.4
CONTROL COST:	$11,000 TO $17,000 PER TON REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to seek emission reductions from wood burning fireplaces and wood stoves.

Background

The types of devices used to burn wood in a typical residence are fireplaces and wood heaters which include fireplace inserts and free-standing wood stoves. Since fireplaces are very inefficient heat sources, they are used primarily for aesthetic effects. Fireplace inserts and wood stoves are much more efficient and in some residences are used as the primary source of heating.

Equipment Description

(The following discussion of wood burning devices is taken directly from U.S. EPA AP-42, Sections 1.9 and 1.10, October 1996.)

Fireplaces can be divided into two broad categories: (1) masonry (generally brick and/or stone, assembled on site, and integral to a structure) and (2) prefabricated (usually metal, installed on site as a package with appropriate duct work). Some prefabricated fireplaces can be inserted into existing masonry fireplace openings, and thus are called “inserts”.

Wood stoves are enclosed wood heaters that control burning or burn time by restricting the amount of air that can be used for combustion. They are used both as the primary source of residential heat and to supplement conventional heating systems. Based on known variations in construction, combustion, and emission characteristics, there are five different categories of

residential wood heating devices: (1) the conventional wood stove; (2) the non-catalytic wood stove; (3) the catalytic wood stove; (4) the pellet stove; and (5) the masonry heater.

Emissions

Emissions from residential wood burning devices, caused primarily by incomplete combustion, include PM, CO, NOx, SOx, and VOC, although particulate emissions have been the focus of other air district control programs. Studies indicate that the majority of particulate emissions from residential wood burning are in the fine fraction (2.5 micrometers or less). Additionally, incomplete combustion of wood produces polycyclic organic matter, a group of compounds classified as hazardous air pollutants under Title III of the federal Clean Air Act.

The emissions inventory from residential wood burning in the District is presented in the control measure summary. The emissions inventory was developed based on the estimated number of wood-burning households and the amount of wood burned per household by county, and U.S. EPA's AP-42 emission factors. District staff, in cooperation with CARB and other stakeholders, has been re-evaluating the emissions inventory in conjunction with current rule development efforts.

Regulatory History

Prior to the 2003 AQMP, the District had not developed a control measure for residential wood burning for rule development. The U.S. EPA and CARB regulations of this source are discussed below.

In 1988, the U.S. EPA promulgated New Source Performance Standards for new wood heaters (i.e., wood stoves and fireplace inserts) to reduce PM emissions. Since then, the U.S. EPA has regulated the manufacture and sale of new wood heaters in the U.S. with standards becoming effective in 1990. Phase I of the regulation required that after July 1, 1990, catalytic wood heaters must be certified to meet 5.5 grams per hour particulate matter emission standard and non-catalytic wood heaters must meet an 8.5 grams per hour standard. Phase II requires that new wood heaters sold after July 1, 1992 must meet more stringent standards of 4.1 grams per hour for catalytic heaters and 7.5 grams per hour for non-catalytic heaters.

There are no federal certification requirements for fireplaces. They are exempt from U.S. EPA certification because their air-to-fuel ratios are in excess of the 35:1. Only the states of Washington (WAC 150-31-200) and Colorado (Regulation 4) and the Northern Sonoma County Air Pollution Control District (APCD), San Luis Obispo County APCD, Shasta County Air Quality Management District and Great Basin Unified APCD (Regulation IV, Rule 504, Rule 3:23, and Rule 431, respectively) have fireplace standards. The California APCDs referenced above require all new wood burning devices (including fireplaces) installed in new or existing units to meet, at minimum, U.S. EPA Phase II emission standards. In effect, these regulations limit new residential wood burning devices to wood burning stoves, fireplace inserts, pellet-fueled wood heaters, or dedicated gas-fired fireplaces.

In 1989, the CARB adopted a suggested control measure (SCM) for emissions from residential wood heaters. CARB's SCM for the Control of Emissions from Residential Wood Combustion

includes a list of specific control strategies for new and existing residential wood heaters (i.e., fireplace inserts and wood stoves – not fireplaces). CARB's SCM includes the following:

Public awareness programs: Retailers of wood heaters will be required to have available to customers, public information that includes pamphlets or other information discussing the proper operation and maintenance of wood heaters and health effects of wood smoke.

Replacement of existing wood heaters: Upon the sale of real property that contains a wood heater, the heater must be an EPA-certified, Oregon-certified, or pellet-fueled wood heater.

EPA Phase II requirements: This strategy will accelerate the implementation date by a year and a half, new wood heaters meeting EPA's Phase II requirements by January 1, 1991.

Sale of Used wood heaters: After January 1, 1991, used wood heaters that are offered for sale must be EPA-certified, Oregon-certified, or be pellet-fueled.

Moisture content of seasoned wood: Firewood that is offered for sale as "seasoned wood" must have a moisture content of 20 percent by weight or less.

Prohibited fuel types: Garbage, treated wood, plastic, rubber, waste petroleum products, paints and paint solvents, and coal having a sulfur content exceeding more than one percent by weight are prohibited from being burned in a residential wood-burning appliance.

Voluntary curtailment program: This program involves the voluntary curtailment of the use of wood heaters and fireplaces during poor air quality conditions.

As discussed above, a number of California air pollution control districts have adopted rules that regulate emissions from residential wood combustion. The requirements of these rules vary from voluntary programs to curtail burning on days with poor air quality to voluntary or mandatory installation of lower-emitting wood stoves to limiting or banning the installation of wood burning devices in new buildings. A sample of pertinent requirements from some of these air districts' rules is presented below.

- All solid fuel appliances (including fireplaces) must meet EPA Phase II certification. (Great Basin APCD)

- Mandatory wood burning curtailment when an Air Quality Index (AQI) over 150 is forecast. (San Joaquin Valley Unified APCD)

- Prior to the completion of the sale or transfer of any real property, all existing non-certified solid fuel appliances must be replaced, removed, or rendered permanently inoperable. (San Joaquin Valley Unified APCD)

- Installation of wood burning fireplaces is prohibited in new residential subdivisions with a density of greater than two dwelling units per acre. (San Joaquin Valley Unified APCD)

PROPOSED METHOD OF CONTROL

Fireplace and wood stove emissions are highly variable and are a function of wood characteristics and operating practices. In general, conditions which promote a fast burn rate and higher flame intensity enhance secondary combustion and thereby lower emissions. Studies performed by U.S. EPA have shown that new combustion device technology and non-conventional fuels (e.g., natural gas.) can considerably increase combustion efficiency and thereby significantly reduce emissions. Consequently, a technologically effective control strategy would ensure that all new wood combustion devices (i.e., including fireplaces) meet U.S. EPA certification standards (or other equivalent or more stringent standards[1]) and would also accelerate the turnover of existing non-certified combustion units.

Based on a re-evaluation of the emissions inventory for wood burning devices as well as the feasibility analysis of potential control strategies, a number of control strategies could be pursued including, but not limited to, those adopted by other air districts and those suggested by CARB. The following is a summary of the proposed multi-faceted program.

- Implementation of a comprehensive education and outreach program to educate the public on wood smoke health effects, the cleanest wood burning technologies (e.g., natural gas) and proper wood burning techniques (i.e., use of seasoned or dry wood)

- Development and implementation of a gas log exchange program to encourage the public to install gas log set in existing open hearth fireplaces and to replace non-U.S. EPA Phase II-Certified wood burning heaters with natural gas units.

- Development and implementation of a voluntary wood burning curtailment program during periods of poor air quality (i.e., > 35 $\mu g/m^3$).

- Standards for new construction;

- Prohibition of burning non-wood items (trash);

- Distribution of industry- and District-prepared outreach material to wood burning appliance and firewood customers at the point of sale.

- Removal or replacement of non-U.S. EPA Phase II-Certified wood burning heaters during property transfers in areas with elevated PM2.5 concentrations; and

- Based on a suggestion by CARB, this measure will consider development and implementation of a mandatory wood burning curtailment program during winter months (November through the end of February) when forecasted ambient 24-hour PM2.5 concentration levels are greater than 35 $\mu g/m^3$. This generally, corresponds to

[1] More stringent standards may include thermal efficiency standards. Increased thermal efficiency likely reduces emissions since less fuel is consumed to produce the same amount of heat. There has been little incentive for manufacturers to increase thermal efficiency since efficiency testing is not required in the U.S. EPA New Source Performance Standard certification process.

an AQI value of 100 - Unhealthful for Sensitive Groups[2] (Cautionary statement people with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion). Based on implementation of a mandatory curtailment program by 2014, staff estimates that the number of days greater than an ambient level of 35 μg/m^3 will be fewer than 20 and decreasing over subsequent winter seasons.

Other control strategies of equivalent or better effectiveness to those listed above will also be considered during the rulemaking process.

EMISSIONS REDUCTION

The District staff is currently in rulemaking process for this source category and it considers various elements implemented by other air districts, including a voluntary curtailment of using woodburning fireplace and stones during high pollution days. Emission reductions associated with this control measure would depend on amendments to the existing emissions inventory and the control strategy pursued. For reference, the recently adopted wood smoke control program for the Sacramento area estimated a five percent reduction in residential wood burning PM emissions (Sacramento Metropolitan AQMD, 2006). A 20 percent reduction of PM emissions on an average winter day was estimated for the adopted San Joaquin Valley wood smoke control program with the majority of emission reductions resulting from mandatory wood burning curtailment during periods of poor air quality (SJVUAPCD, 2003). It should also be noted that while controlling emissions from residential wood burning is primarily intended to reduce particulate emissions, an added benefit would also be reduced emissions of CO, VOC, NOx, SOx, and hazardous air pollutants. This control measure is estimated to achieve approximately 1.0 ton per day (15%) reduction on an annual basis overall from this source category by 2014.

RULE COMPLIANCE

Compliance requirements for this control measure would depend on the control strategy implemented.

TEST METHODS

The appropriate test methods for this control measure would depend on the control strategy implemented.

COST EFFECTIVENESS

The cost effectiveness of this control measure ranges from $11,000 to $17,000 per ton reduced based on either change-out to a U.S. EPA-certified Phase II wood burning appliance or conversion of a fireplace to a dedicated gas unit. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available. Incremental costs to install a U.S. EPA-certified Phase II wood burning appliance, a dedicated natural gas fireplace insert and an

[2] Based on the current AQI system, a PM2.5 concentration of 35 μg/m^3 equates to an AQI of 91. It should be noted that revisions will be made to the AQI index thresholds based on the recently adopted federal PM2.5 24-hour standard.

electric fireplace insert in new construction have been estimated at $2,500, $500, and $400, respectively (Sacramento Metropolitan AQMD, 2006).

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001). Specifically, the District has the authority to reduce or mitigate emissions from area sources such as residential wood burning devices (Health and Safety Code §40716).

REFERENCES

CARB, Section 7.1, Residential Wood Combustion, July, 1997.

CARB, Proposed Clean Air Plan (Rescinded), March 2002.

CARB, Agenda, Public Meeting to Consider Approval of a Suggested Control Measure for the Control of Emissions from Residential Wood Combustion, November 1989.

Great Basin Unified APCD, Rule 431 – Particulate Emissions – Town of Mammoth Lakes

Northern Sonoma APCD, Regulation IV - Control Measure for Wood Fired Appliance Emissions.

Sacramento Metropolitan AQMD, Draft Staff Report, Rule 417, Wood Burning Appliances, July 12, 2006.

San Joaquin Valley Unified APCD, Final Draft Staff Report, Amendments to Rule 4901 (Wood Burning Fireplaces and Wood Heaters), June 19, 2003.

U.S. EPA, AP-42, Section 1.9, Residential Fireplaces, October 1996.

U.S. EPA, AP-42, Section 1.10, Residential Wood Stoves, October 1996.

U.S. EPA, Residential Wood Combustion Technology Review - Volume 1. Technical Report, EPA-600/R-98-174a, December 1998.

ADDITIONAL PM EMISSION REDUCTIONS FROM RULE 444 – OPEN BURNING [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	OPEN BURNING		
CONTROL METHODS:	BURN RESTRICTIONS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM10 INVENTORY			
PM10 REDUCTION		SEE EMISSIONS REDUCTION SECTION	
PM10 REMAINING			
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Rule 444 outlines the criteria and guidelines for agricultural and prescribed burning, as well as training burns to minimize PM emissions and smoke in a manner that is consistent with state and federal laws. Agricultural burning is open burning of vegetative materials produced from the growing and harvesting of crops, as well as fields preparation in agricultural operations. Prescribed burning is a planned open burning of vegetative materials, usually conducted by a fire protection agency and/or department of forestry, to promote a healthier habitat for plants and animals, and to prevent plant disease and pest, as well as fire episodes and destruction. Training burns are hands-on trainings conducted by fire protection agencies on methods of preventing and/or suppressing fire.

Background

Currently, Rule 444 allows open burning on permissive burn days, provided that permit and event authorization are obtained, and that such burning events are not prohibited by a fire protection agency. A permissive burn day is declared by the District when certain meteorological conditions are met and the 1-hour ozone level does not exceed the state standard of 0.09 ppm. Rule 444 also includes general requirements (i.e., burning time window and ignition device) for open burning, as well as particular requirements, such as moisture level and firing methods for agricultural burning, and a Smoke Management Plan for prescribed burning. In addition, Rule 444 sets District-wide maximum daily burn acreage for agricultural and prescribed burning, but is lenient toward training burns if the duration is less than 30 minutes and clean fuel is utilized.

This control measure calls for potential administration and compliance streamlining of the burn program, as well as additional and/or alternative controls to further reduce PM emissions and

smoke from open burning. Alternatives to open burning are also required by state law for the San Joaquin Valley where agricultural burning will be phased out by the year 2010.

Regulatory History

Rule 444 – Open Burning, (previously Open Fires) was adopted October 1976. It has been amended three times, first in 1981. The rule was amended in 1987 to incorporate provisions of California Code of Regulations, Title 17 addressing wildland vegetative management burns. The rule was amended in 2001 to incorporate the Smoke Management Guideline requirement of the amended Title 17 and implement 1999 AQMP Control Measure WST-03.

PROPOSED METHOD OF CONTROL

Description of Control Opportunities

Further PM emission reductions can be achieved through the following:

- Consideration of alternatives (i.e., chipping/grinding and/or composting) to agricultural burning, especially if the burn project is located within a close proximity to a sensitive receptor. Potentially seek authority to phase-out of agricultural burning, potentially by 2015, as all feasible measures pursuant to San Joaquin Valley APCD requirements.
- Establishment of a fee schedule and/or regulatory incentive program to limit agricultural burning and promote alternatives.
- Establishment of criteria (fuel types, burning areas) for prioritizing training burns and agricultural burning requests.
- Establishment of "no burn days" based on a PM2.5 daily forecast. A threshold similar to the current federal 24-hour standard of 65 $\mu g/m^3$ or the future 35 $\mu g/m^3$ may be used. No-burn day may be established based on 8-hour ozone predictions.
- Prohibition and/or restriction of burning hours in case of unexpected changes in meteorology conditions.
- Requirement of a Smoke Management Plan (where specific plans to curtail PM emissions and smoke are included) and the utilization of clean fuel for all prescribed and training burns.
- Restriction of total burn time and/or number of structures to be used for training burns, as well as limit multiple training events by single agency.

EMISSIONS REDUCTION

PM emissions from open burning are estimated at 0.63 ton per day. The proposed measure would eliminate 0.63 tons per day of PM2.5 on days when open burning is prohibited. However, since such burning would be shifted to other days, the total annual emissions would remain the same, thus the emission reductions.

RULE COMPLIANCE

This control measure would be implemented using existing resources. Requirements would be effective upon rule adoption.

COST EFFECTIVENESS

The rule amendment will focus on better program management and data collection, with no real emission reductions. Therefore, no additional costs are anticipated.

IMPLEMENTING AGENCY

The District has the authority to implement this measure.

REFERENCES

Rule 444 – Open Burning California Code of Regulations, Title 17 – Agricultural Burning Guidelines

PM EMISSION REDUCTIONS FROM UNDER-FIRED CHARBROILERS [PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	UNDER-FIRED CHARBROILERS		
CONTROL METHODS:	ADD-ON CONTROL EQUIPMENT WITH VENTILATION HOOD REQUIREMENTS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	11.3	13.2	14.4
PM2.5 REDUCTION		1.1	1.2
PM2.5 REMAINING		12.1	13.2
CONTROL COST:	$13,000 - $15,000 PER TON PM10 REDUCED		
IMPLEMENTING AGENCY:	AQMD/LOCAL GOVERNMENTS		

DESCRIPTION OF SOURCE CATEGORY

Restaurant operations emit PM and VOCs. Both of these pollutants can cause adverse health impacts, as well as causing a potential nuisance to the local community.

Background

The 1997 AQMP contained Control Measure PRC-03 - Emission Reductions from Restaurant Operations. Rule 1138, adopted in November 1997, implemented Phase I of this control measure, reducing 0.5 ton/day of PM10 emissions from chain-driven charbroilers. Under-fired charbroilers are the largest contributor to the PM inventory contributing approximately eighty-three percent. Restaurant operations include charbroilers, griddles, deep fat fryers, ovens, and other equipment. The total PM10 inventory is approximately 11.4 tons/day (11.3 of which is PM2.5) and 1.6 tons/day VOC. Under-fired charbroilers are responsible for the majority of emissions from this source category (84 percent [9.6 tpd] of PM emissions, and 71 percent [1.2 tpd] of VOC emissions). Griddles account for approximately five percent of the total PM restaurant emissions inventory and four percent of the total VOC emissions. Oven emissions appear to be negligible. Based on the contribution of emissions from under-fired charbroilers, they were chosen as the next logical piece of basic equipment for which to seek cost-effective controls.

Regulatory History

The 1999 Amendment to the 1997 Ozone State Implementation Plan for the South Coast Air Basin listed PRC-03 – Emission Reductions from Restaurant Operations – Phase II, with reductions of 0.9 tons/day VOC and 7.0 tons/day of PM10.

The Board received a report on emerging control technologies for under-fired charbroilers in May 1999. This report pointed out that a continuing effort to find cost-effective and technologically feasible controls for the restaurant industry has been ongoing since 1991. The earlier phases of this effort included the investment of significant resources in improving test methods and developing emission factors.

In August 2000, staff reported that cost-effective controls were limited and recommended substituting the remaining 0.9 tons/day of VOC emissions assigned to this source category with another control measure achieving excess VOC emission.

However, because of the significant contribution of the restaurant operations to the PM emissions inventory, the 2003 AQMP included Control measure PRC-03 – Emission Reductions from Restaurant Operation to reduce PM10 emissions by 1 ton per day by 2010. This limited emission reduction projection from a baseline of approximately 10 tpd was based on the fact that cost-effective controls for the majority of under-fired charbroilers had not been developed. A report to the Board was made December 2004 recommending findings of infeasibility be made, and substitute emission reductions from other adopted rules, as required by the 2003 AQMP. Staff also recommended funding for demonstration projects.

The Board authorized up to $200,000 from mitigation fees collected pursuant to Rule 1309.1 – Priority Reserve, to fund six to eight new or retrofit demonstration sites on large restaurants. However, no applications have been received to date for this project.

PROPOSED METHOD OF CONTROL

Restaurant operations continue to be significant contributors in the PM10 and PM2.5 emission inventory. The District intends to continue its efforts in the research and development of control technologies that would cost-effectively reduce particulates from restaurant operations and intend to amend its rules should those technologies become available.

It has recently come to staff's attention that the Bay Area AQMD has proposed a new rule for commercial cooking equipment. While this proposal reflects the District's Rule 1138 for chain driven charbroilers, it also contains control requirements for new and existing underfired charbroilers with a facility-wide cooking surface of greater than or equal to 10 square feet. The Bay Area AQMD proposal identifies a list of feasible control technologies available to reach an emissions limit of 1.9 pounds of PM10 per 1,000 pounds of meat cooked. Control options include electrostatic precipitators (ESP), high efficiency (HEPA) filters, wet scrubbers, and thermal oxidizers. The proposal also requires ventilation hoods on new installations to meet standards of the Underwriters Laboratory (UL). Staff will further investigate the Bay Area AQMD's technical assessment and monitor rule implementation. As stated in the Bay Area AQMD draft Staff Repot, technology advancement is necessary for retrofit applications on existing sources. District staff will be working with the Bay Area AQMD staff to develop this measure.

In conjunction with this effort, staff will also evaluate potential PM10/PM2.5 credit generation opportunities for use by other sources.

EMISSIONS REDUCTION

Based on the Bay Area AQMD rule development effort, a 90 percent reduction of PM10 is estimated for underfired charbroilers using one of the identified emission control technologies. If the District were to adopt and implement the same requirements, focusing on a 90 percent reduction on large volume restaurants using either ESP or HEPA filter technology, staff estimates that a reduction of 1.1 tons per day (8 percent) overall from this source category by 2014.

TEST METHODS

In conjunction with the rule development process for Rule 1138 and associated source testing, the document "Protocol – Determination of Particulate and Volatile Organic Compound Emissions from Restaurant Operations" was published November 14, 1997. These test methods are currently being used for testing of charbroilers and potential control devices. The test methods are used by qualified labs to certify the emissions level of specific control systems but are not employed to test emissions at individual restaurants.

COST EFFECTIVENESS

The cost-effectiveness associated with achieving the 1.1 ton per day reduction by underfired charbroilers is estimated to be between $13,000 and $15,000 per ton PM2.5 reduced based on the use of either ESP or HEPA filters. The District will continue to analyze the potential cost impacts on the industry during rulemaking.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from restaurant operations.

REFERENCES

Report to the Governing Board December 2004 - Staff Recommendations Regarding Controlling Emissions from Restaurant Operations.

BAAQMD Draft Staff Report, Regulation 6, Rule 2: Commercial Cooking Equipment, April 2007.

GROUP 5

Multiple Component Sources

FACILITY MODERNIZATION
[NOx, VOC, PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ALL FACILITIES		
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS RELATED TO TODAY'S BACT AND SUPERCOMPLIANT COMPOUNDS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NO_X INVENTORY	22.6	12.1	9.8
NO_X REDUCTION		1.6	2.0
NO_X REMAINING		10.5	7.8
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NO_X INVENTORY	24.6	13.2	10.8
NO_X REDUCTION		1.8	2.2
NO_X REMAINING		11.4	8.6
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	13.6	14.2	16.3
VOC REDUCTION		2.0	8.0
VOC REMAINING		12.2	8.3
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	15.8	16.3	18.7
VOC REDUCTION		2.3	9.2
VOC REMAINING		14.0	9.5
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	3.3	3.9	4.3
PM2.5 REDUCTION		0.4	1.7
PM2.5 REMAINING		3.5	2.6
CONTROL COST:	$10,600 TO $17,000 PER TON NOX REDUCED; $10,000 PER TON VOC REDUCED; $19,000 PER TON PM2.5 REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

This control measure would obtain further emission reductions of NOx, VOC, and PM2.5 by requiring that facilities modernize permitted equipment and processes and use supercompliant materials based on a set of pre-specified equipment useful life.

For NOx emission reductions, existing equipment at facilities not participating in the NOx RECLAIM program would need to be retrofit or replaced with BACT at the end of a pre-determined life span. For facilities participating in the NOx RECLAIM program, further NOx reductions will be obtained through periodic BARCT evaluation and other program review.

For VOC emission reductions, supercompliant VOC materials would be required for surface coating applications, where feasible, beginning with 10 tpy or greater VOC facilities. Facilities subject to Rule 1132 are excluded from this measure, because they are already subject to a 65% facility-wide reduction in VOC emissions.

PM2.5 emissions reductions would be obtained from both RECLAIM and non-RECLAIM facilities through this control measure.

This comprehensive control strategy is comprised of five facility emission components:

- Combustion Sources – NOx
- Fugitive VOC Emissions
- Industrial Coating and Solvents Operations - VOC
- PM2.5 Emissions from Facility Operations
- Fugitive PM2.5

Background

BACT

The District's New Source Review (NSR) programs[3] establish pre-construction permit review requirements for equipment or processes subject to permit requirements. Under NSR, applicants are required to incorporate BACT when new equipment is installed, existing stationary permitted equipment is relocated, or existing permitted equipment is modified such that there is an emissions increase. BACT means the most stringent emission limitation or control technique which:

- Has been achieved in practice for such category or class of source; or
- Is contained in any state implementation plan approved by EPA for such category or class of source (unless demonstrated to the satisfaction of the Executive Officer or designee to be not presently achievable); or

[3] The NSR programs include Regulation XIII – *New Source Review* and Rule 2005 – *New Source Review for RECLAIM.*

- Is any other emission limitation or control technique, found by the Executive Officer or designee to be technologically feasible for such class or category of sources or for a specific source, and cost-effective as compared to measures listed in the AQMP or rules adopted by the District Governing Board.

Existing Equipment

Although control measures are routinely applied to existing sources, it is generally more difficult and costly to retrofit existing equipment with BACT than it is to apply BACT to a new source. The equipment being retrofit may not be compatible with current BACT if a specific process or method is needed. There may also be space restrictions that prevent installation of some add-on control technology.

Consequently, control measures targeting existing combustion sources typically do not reduce emissions to the same levels that would be obtained from the application of BACT. And, although NSR requires BACT for new, relocated, or modified equipment with an emissions increase, older equipment is allowed to remain in operation for many years, provided that the equipment complies with applicable rules for existing equipment. As a result, emission reductions to the level of BACT are not achieved for older equipment, and there is currently no mechanism that limits the continued use of such equipment.

This control measure ensures that as equipment ages and reaches the end of useful life, the equipment is either upgraded or replaced to meet BACT. This measure would provide the certainty for implementation of the cleanest available technology within the time frame of the attainment dates.

Regulatory History

This control measure would affect a wide variety of permitted equipment and processes. Consequently, the rules and regulations impacting the affected sources are extensive and are summarized briefly.

Regulation IV - Contains more than 35 rules that place prohibitions on equipment or operations. Several of these rules place restrictions on the exhaust concentrations of different combustion contaminants. For instance, Rule 474 (Fuel Burning Equipment - Oxides of Nitrogen) limits the NOx emissions from fuel burning equipment. For recently permitted equipment, many of these rules are superseded by more stringent BACT limits.

Regulation IX is derived from federal law and specifies standards of performance for new stationary sources. The regulation consists of more than 70 subparts. Most of the standards in this regulation have been adopted by the District without change and are enforced by delegation from the USEPA. As an example, Subpart Eb provides standards of performance and emission guidelines for municipal waste combustors.

Regulation X is also derived from federal law and specifies standards for handling hazardous materials. The regulation consists of at least 15 subparts. The federal standards have been adopted by the District without change and are enforced under EPA authority.

Regulation XI contains source-specific standards and is composed of more than 85 rules. As an example, Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines) places NOx, CO, and VOC limits on engines. For engines that have been permitted for many years and have not been recently subject to BACT, this rule may be the most restrictive in terms of limiting engine emissions. Another example is Rule 1118 (Emissions from Refinery Flares). Regulation XI rules are tailored to specific types of air pollution sources.

Regulation XIII (New Source Review) sets forth the requirements that proposed new or modified stationary sources must meet before construction can take place. These requirements are in addition to those specified by other rules and include use of Best Available Control Technology, offset of emission increases, and a demonstration that air quality will not be diminished as the result of the construction or modification.

Regulation XIV (Toxics) consists of more than 15 rules that address toxic air contaminants. Rule 1401 pertains to the New Source Review of toxic air contaminants, and Rule 1402 controls toxic air contaminants from existing sources.

Regulation XX (RECLAIM) specifies requirements for facilities participating in the market incentive program, which is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx. Rule 2005 provides New Source Review requirements for RECLAIM facilities.

Regulation XXX (Title V Permits) defines permit application and issuance procedures and also compliance requirements associated with the federal Operating Permit Program. This regulation is mandated by Title V of the federal Clean Air Act.

PROPOSED METHOD OF CONTROL

The concept of this control measure is to ensure timely upgrade of existing technology to the cleanest technology available. The District, as part of rulemaking will develop a list of useful equipment life by equipment category. The equipment operators are expected to achieve BACT or equivalent emission limits at the end of useful life through equipment replacement or retrofit technology. The term BACT in the context of this control measure only refers to the limit or control technology specified in NSR regulations. For VOC solvent/coating facilities, this measure would begin with 10 tpy or greater facilities to design a program to encourage application of supercompliant materials or process change to achieve emission reductions.

During the rulemaking process for this control measure, a more detailed analysis will be performed to establish appropriate useful lives for various equipment categories and size ranges. Special consideration will be given to past retrofit requirements and investments made, to ensure that reasonable useful lives for various equipment types are obtained. During the implementation phase of this control measure, consideration should be given to those facilities reducing their emissions through retrofits/replacements of their existing equipment to least polluting alternatives (BACT) to ensure that they do not trigger emission offsets and/or other NSR requirements, if consistent with federal law. It should be noted that offsets are only targeted when there is an emissions increase.

As part of its efforts to implement this control measure and to promote facility modernization, the District will forge partnerships with local businesses, trade organizations, environmental groups, and other stakeholders, and pursue state and federal tax incentives. The District will follow a two-step public hearing procedure which will provide a pre-hearing to receive public comments on the basic program design prior to the adoption hearing before the District's Governing Board. The District will also work with EPA and other stakeholders on any potential issues such as the applicability of an NSR event to equipment replacements and determination of equipment life prior to rule adoption. Early replacement of equipment significantly prior to specified useful life may qualify for the tax incentives. Potential credit generation will also be explored during rule development.

EMISSIONS REDUCTION

The emission reductions for NOx, VOC and PM2.5 are shown in the summary table. There may also be concurrent emission reductions in SOx, and CO. For purposes of emission reduction calculations, the refinery sector is excluded because reductions are included in FLX-02.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source-specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The estimated cost effectiveness for NOx reductions through this control measure ranges from $10,600 to $17,000 per ton reduced, based on a variety of combustion equipment. NOx reductions may also be obtained from additional equipment, depending on results from further analyses during the rulemaking process. .

A cost-effectiveness of $10,000 per ton was estimated for sources of VOC. This value corresponds to a reasonably conservative cost-effectiveness for facilities subject to the January 2001 amendment to Rule 1132 Further Control of VOC Emissions from High-Emitting Spray Booth Facilities. This value was deemed appropriate because of the similarity between this control measure and Rule 1132. That is, both reduce VOC on a facility-wide basis by lowering the VOC content of coatings or through the application of add-on controls.

A cost-effectiveness of $19,000 per ton was estimated for sources of PM2.5. This value was based on the $4,500 per ton of PM10 cost-effectiveness for facilities subject to the minor source BACT, if one assumes a four to five PM10 to PM2.5 ratio, by weight.

A comprehensive evaluation of costs and impacts on businesses will be conducted during the rulemaking process. Any potential tax incentives that may be made available would improve the cost effectiveness beyond the figures provided.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from the targeted sources.

REFERENCE

South Coast Air Quality Management District. Best Available Control Technology Guidelines. July 14, 2006.

URBAN HEAT ISLAND
[ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ROOFING, PAVING, AND BUILDING MATERIALS AND TREE PLANTING PROJECTS
CONTROL METHODS:	USE OF MORE REFLECTIVE AND LIGHTER COLOR SURFACES ON EXTERIOR SURFACES LOCATED IN URBAN AREAS
EMISSIONS:	IMPLEMENTATION OF THIS CONTROL MEASURE IS EXPECTED TO LOWER AMBIENT TEMPERATURES IN URBAN AREAS. LOWER AMBIENT TEMPERATURES WOULD DECREASE THE FORMATION OF OZONE, WHICH IN TURN IS EXPECTED TO RESULT IN IMPROVED AIR QUALITY.
CONTROL COST:	NOT DETERMINED.
IMPLEMENTING AGENCY:	AQMD, CEC, LOCAL GOVERNMENT

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to encourage activities that would lower ambient temperatures in urban areas. This control measure focuses on encouraging activities such as using lighter, more reflective surface materials and increased tree planting.

Background

Over the past four decades, summer temperatures in urban cities throughout the nation have increased by 2 to 4°F. Since 1940, it is estimated that peak temperatures in Los Angeles have increased approximately 5 to 6°F (Akbari, et al, 1990; EPA, 1990). The increased temperatures are primarily occurring in urban areas. Moreover, studies have shown that summer temperatures in urban areas are typically 2°F to 8°F higher than in their rural surroundings (EPA, 1992).

The difference between urban and rural temperatures is referred to as the "urban heat island effect." The replacement of natural vegetation such as trees, grass, and soil with concrete and asphalt reduces the landscape's ability to lower daytime temperatures and loses the benefits of shade. In addition, the use of dark colored materials and surfaces that absorb, rather than reflect incoming solar energy adds to the effect, thus increasing temperatures in cities and urban areas.

The urban heat island effect has adverse impacts on air quality and energy demands. The increased solar gain absorbed by the city can increase energy demands for cooling and accelerate ozone formation. Studies indicate that in large metropolitan cities such as Los Angeles, utility peak loads will increase 1.5 to 2 percent for every 1°F increase in temperature. In Los Angeles, energy loads for both Los Angeles Department of Water and Power (LADWP) and Southern California Edison (SCE) increase by about 2 percent per °F with respect to the base load (Taha, et al, 1992).

The ability of a surface to reflect is referred to as albedo and is measured from zero to one, with one representing the most reflective and zero representing the most absorbent. Most buildings and cities have albedos between .20 and .35 (Akbari, et al, 1990). To reduce urban temperatures, albedos can be increased by using lighter, more reflective materials on surfaces of roofs and pavement (roads and parking lots). In addition to providing shade to buildings and surfaces, trees cool the air directly by evapotranspiration and block solar radiation and prevent these structures and surfaces from heating up beyond the ambient temperature (LADWP, 1992). Moreover through evapotranspiration, the natural releasing of water vapor from leaves and trees cools the environment, thus bringing down the temperature of the entire area.

A preliminary air quality modeling analysis indicates cooler surfaces and tree planting can improve the ozone air quality in Los Angeles. Initial results indicate that through cooler surfaces for homes, office-building roofs, and paved surfaces, and planting 11 million trees in Los Angeles, that the heat island effect can be reduced between 3 - 7°F (Rosenfeld, et al, 1996).

In May 2002, the District co-funded a project with the City of L.A., L.A. Department of Water and Power, Lawrence Berkeley Laboratories and the California Energy Commission to assess the effects of using lighter colored roofing materials to improve energy efficiency and to lessen the urban heat island effect. A field study was conducted to measure the changes in surface temperatures in light colored roofing and paving materials installed in and around the L.A. Zoo. This and other studies will provide better data on the effectiveness of lighter colored materials to lessen the urban heat island effect.

A study was conducted in 1998 to quantify the air quality benefits of the cool community concept by applying an appropriate air quality modeling approach (ENVIRON, 1998). Cool communities impacts on temperature and dispersion were mapped using the Urban Airshed Model (UAM) to evaluate the meteorological effects on ozone formation and transport within the Basin. Maximum ozone reductions were found to be about 8 parts per billion (ppb). A follow-up study was conducted to explore ways in which the air quality benefits that accrue from the implementation of urban heat island mitigation strategies can be converted into quantifiable emission reductions (ENVIRON, 2001). This study analyzed three options for regulatory approaches in generating emission reductions including: local governments modifying building codes to require the use of light colored materials, public or private groups providing cash or other incentives to building owners to install lighter colored materials, and the District requiring the use of lighter colored materials with the resulting emission reductions applied for SIP purposes.

Regulatory History

In January 1992, the EPA introduced a publication, Cooling Our Communities: A Guidebook on Tree Planting and Light-Colored Surfacing. This guidebook discussed the causes, magnitude and impacts of increased urban heat islands.

There are communities within the Basin which have tree planting programs and ordinances already in effect. In addition, some utilities provide educational guidance brochures regarding tree planting.

PROPOSED METHOD OF CONTROL

This control measure proposes to develop a program to promote the use of light colored roofing and pavement materials, solar roofing membranes, and increased tree planting. Programs to promote use of more reflective pavement and tree planting could be a required element for new sources, or could be included as recommendations through the District's California Environmental Quality Act (CEQA) Air Quality Handbook. Sources such as builders, utilities, cities and local government agencies, and private citizens, etc. that promote the use of lighter colored materials and increased tree planting could be eligible for an emission credit. Emission credits could be issued based on types of surface materials used or numbers of trees per unit or area that meet or exceed a specified benchmark.

There are a variety of techniques that can be implemented to reduce urban temperatures and increase the albedo of roofs, pavements, and building surfaces. Most of these techniques can be implemented during the maintenance or modification of existing structures or during the building stages of new structures.

Roofing Materials

The reflectivity of roofs is measured in terms of roof temperature at noon on a clear summer day, with an air temperature of 90oF, averaged over the warranted life of the roof. A gray roof with a smooth or washable texture would have a roof temperature under the aforementioned conditions of approximately 160oF. A light green roof has a higher albedo, and accordingly a lower surface temperature of 135oF.

One method of achieving higher albedos is to coat existing surfaces or modify the makeup of new surfaces so that they incorporate lighter colored materials. Available techniques for roof whitening include, but are not limited to the following (Taha, et al, 1992):

- adding light-colored aggregate to the roofing material;
- light-colored rocks on flat or gently-sloped roofs;
- colored or painted roofs;
- coating with elastomeric coatings and single plies; and
- using light-colored concrete tiles on sloping roofs.

In addition to these techniques, the use of integrated roofing membranes using solar photovoltaic arrays can have a combined effect of lowering the thermal impacts on commercial and industrial building roofs while at the same time supplying the electricity needs of these buildings. Such products consist of an array of photovoltaic modules integrated into a flexible polyester-based roofing membrane. These roofing membranes have relatively high albedos (e.g., 0.8) and can be equipped with insulation thereby, reducing the thermal impacts on roofs. The photovoltaic modules convert much of the incoming sun's energy directly into electricity, substantially reducing the energy absorbed by a roof.

Pavement and Building Surface Materials

Within the city, there are a number of urban surfaces such as streets, sidewalks, parking lots, school yards, and other similar surfaces, that have dark surfaces. The following identifies techniques that can be implemented to lighten urban surfaces (Taha, et al, 1992, Pomerantz, 1996):

- using light-colored aggregates in the upper layer of the asphalt in new pavements;
- using a light-colored slurry or chip seal when resurfacing;
- using concrete rather than asphalt, with a light-colored aggregate and binder;
- whitetopping (light-colored concrete pavements);
- using artificial lighteners in preparing the mixtures of asphaltic concrete and slurry seals; and
- using paints of light colors that are designed specifically to resist weathering, wear and tear, and other environmental effects.

In addition to selecting materials with high albedos, other considerations are important to ensure that materials maintain their original albedos. Considerations that should be taken into account include, but are not limited to material wear resistance, effects of soiling, and surface texture. In addition, in selecting materials for roads, parking lots, and driveways, it is important that the light-colored surface has a non-skid finish.

Tree Planting

To help lower an entire city's temperatures through evapotranspiration, street trees need to be planted in public as well as private spaces such as parking lots, plazas, street meridians, sidewalks, residential yards, corporate lawns, parks, and shopping plazas (EPA, 1992). For homes and buildings, the most dramatic cooling takes place when trees directly shade windows, walls, roofs, and air-conditioning units (LADWP, 1992). For residences, most experts suggest planting three or more trees, placing them so they will shade the home and outdoor living areas during the summer months (SCE, 1991). The air conditioning savings are even greater when the tree shades an office building with large windows and long air conditioning hours.

A general rule of thumb is to plant at least five to ten feet from a structure; moreover, the shape and projected mature spread of the tree should be taken into account in this distance (LADWP, 1991). To maximize the evaportranspiration of tree planting programs, the placement of trees in cities is important. The following identifies tree planting strategies that should be considered to maximize the cooling benefits associated with increased tree planting:

- shade east- and west facing walls and windows of home or building to reduce air conditioning energy consumption,

- shade roofs to lower the temperature of interiors of homes and buildings, external surfaces, and surrounding environment,
- shade outdoor air conditioning units to increase its efficiency,
- shade nearby walls and flat surfaces such as walkways, driveways, alleys, and the streets, and
- plant trees to influence wind movement and circulation around and through residences and buildings.

In selecting shade trees for large-scale planting, they must be low biogenic emitters (Benjamin & Winer, 1994). Consideration should also be taken for their tolerance to air pollution, water requirements, effect (or lack of effect) on sidewalks, sewer lines and overhead electric lines, and insect and pest resistance (Corchnoy, et al, 1991). The shape, size, species, as well as fire hazards are important to consider in selecting shade trees. In selecting species, it is important that trees with the potential to produce biogenic hydrocarbon emissions be avoided. The District would work with interested parties to develop a list of species of trees that would be recommended for shading.

Currently there are programs such as the $3.5 million dollar effort by the California Urban Forests Urban Council. In addition to tree planting in the Los Angeles area, this project provides services in public education, management support to urban foresters, support to public agencies, government to develop urban forest initiatives and urban forest service and research.

EMISSIONS REDUCTION

Implementation of this control measure is expected to decrease ambient temperatures in the Basin, particularly during summer months. Improved air quality is expected as a result of lower urban temperatures.

RULE COMPLIANCE

Implementation of this measure could be based on the following:

- local government model ordinances;
- legislative strategies for incentives; and
- public outreach for consumer awareness.

In addition, the District may consider the development of an emissions credit mechanism to provide emission credits based on the number of units modified or installed that use materials and colors meeting or exceeding a specified benchmark.

TEST METHODS

ASTM Sub-Committee E06-21 has developed E1980-01 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces to determine indexes and surface temperatures for surfaces with emissivity greater than 0.1.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been fully determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

Implementation of this measure is expected to require the partnership of the District, CEC, and local government.

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ENERGY EFFICIENCY AND CONSERVATION [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	STATIONARY SOURCE FUEL COMBUSTION CATEGORIES
CONTROL METHODS:	INCENTIVES FOR HIGH FUEL EFFICIENCY EQUIPMENT
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF PROGRAM

Background

Energy efficiency and conservation programs reduce emissions of all pollutants and tend to be cost effective. There is a renewed interest in efficiency and conservation programs at local, state, national and international levels. Industrial and commercial businesses and the public also share this interest.

In the 1991, 1994, 1997, and 2003 Air Quality Management Plans the District included energy efficiency and conservation components. The 1991 AQMP included control measures for residential, commercial and industrial sectors and local government conservation measures. That AQMP also included efficiency and conservation goals developed in cooperation with other agencies and affected businesses. The plan included electricity conservation goals of 5 to 15 percent for different sectors and natural gas conservation goals of 20 to 30% for commercial and residential sectors. In later AQMPs, energy efficiency and conservation were addressed within specific control measures.

The 1991 AQMP also addressed global warming and ozone depletion. The District committed to specific measures to reduce emissions of compounds that contributed to both ozone depletion and global warming. In addition, the District committed to working with other agencies to reduce global warming through energy efficiency and conservation.

Current Regulatory Programs

Promoting Clean Energy

Promoting cleaner sources of energy has always been a component of the AQMP. Clean energy produces less air pollution and includes sources such as solar, wind, hydro, bio-fuels and hydrogen. Solar energy can produce electricity using photovoltaic cells or thermal energy by heating water or a heat transfer fluid. Wind can be used to generate electricity using windmills in locations where winds are strong and constant. Examples of bio-fuels include ethanol and bio-diesel produced from plants. Hydrogen can be produced in a variety of ways and when used as a fuel the only byproduct of combustion is water. Electric and hybrid electric vehicles are also cleaner and result in fewer emissions of nitrogen oxides, hydrocarbons and particulate matter compared with conventional gasoline powered vehicles.

Renewable energy sources such as hydro, solar and wind, as well as alternative fuels and electric and hybrid electric vehicles are all components of the plan. The CARB and the District have emission reduction targets for mobile sources that include alternative fuels and hybrid and electric vehicles.

The CEC has established a goal for electric utilities of producing 33% of the state's electricity from renewable resources. Also, at the state level, California also has a solar initiative whose main focus is the installation of photovoltaic cells on residences and commercial buildings to help reduce peak electricity demand. The state will also promote clean energy sources as a means of reducing global warming gasses under a new state law. Greenhouse gasses must be reduced 25% by 2020.

Reducing Energy Demand

Currently there are a variety of programs at the federal, state and local level for reducing energy demand. At the federal and state level, the U.S. Department of Energy (DOE) and the California Energy Commission (CEC) develop minimum energy efficiency standards for residential, commercial and industrial equipment. The USEPA oversees the Energy Star program which promotes energy efficient appliances and equipment for residential, office and commercial use by identifying equipment that exceeds efficiency standards. Equipment which significantly exceeds standards can use the energy star label in advertising and are listed in the energy star database.

Public utilities in California promote conservation and efficiency through advertising rebate programs that offset the cost of energy efficient equipment and conservation programs. These programs are supported by the CEC and the California Public Utilities Commission (PUC).

Reducing energy demand in California through efficiency and conservation is the responsibility of the CEC and PUC. These two agencies in cooperation with utilities and local governments assure the state has an adequate energy supply as well as establish efficiency and conservation goals. Utilities and local governments provide incentives to help meet these goals.

State and Federal Initiatives and Programs

Currently there are a variety of energy efficiency and conservation programs at the federal, state and local level. At the federal and state level, the U.S. DOE and the CEC develop minimum energy efficiency standards for residential, commercial and industrial equipment. The USEPA Energy Star program promotes energy efficient appliances and equipment for residential, office and commercial use which significantly exceed standards.

The California Energy and Public Utilities Commissions require natural gas and electric utilities to include energy efficiency and conservation programs in their operations. Utilities have specific energy conservation goals and commit funds and other resources to provide incentives for property owners and businesses to purchase energy efficient equipment and initiate energy conservation and management programs. Currently, electric utilities have been set a long term goal of having 33% of their generation produced by renewable energy sources.

In addition, California has recently established a program to reduce emissions of greenhouse gasses – pollutants that contribute to global warming. The program has a goal of reducing

emissions by 25% from current levels by 2020. This goal will be achieved in part through promotion of energy efficient technologies and energy conservation.

The state also has a solar initiative program whose emphasis is increasing the amount of energy produced through solar energy. A major focus of this program is to increase the number of photovoltaic systems on residential and commercial buildings to reduce the peak electricity demand on summer afternoons.

At the local level, counties and cities also have energy efficiency and conservation programs and promote conservation by providing incentives to building projects which meet LEED standards (Leadership in Energy and Environmental Standards). LEED is an energy and environmental standards certification program developed by the non-profit U.S. Green Building Council. Local governments can provide a variety of incentives to developers whose projects meet LEED standards such as a quicker review of permit applications.

The USEPA also provides guidance to local air pollution control agencies for including energy efficiency and conservation programs in their state implementation plans. Emission reductions must be quantifiable, enforceable and in excess of reductions from other programs and regulations.

Energy Demand Projections

Information developed by the CEC in the first half of 2006 indicated that the projected increase in demand for natural gas and electricity are expected to be in the range of 1 to 1½ percent per year for the years covered by the AQMP. A similar increase in demand is expected for transportations fuels (i.e., gasoline and diesel). The effect of the state program to reduce greenhouse gas emissions is not known at this time. However, energy conservation and use of more efficient technologies would be expected to mitigate the projected increases in demand for fossil fuels and electricity and would reduce emissions of greenhouse gasses.

Energy Conservation and Efficiency Program Assumed in the Plan

The energy demand forecasts provided by the gas and electric utilities include conservation and efficiency programs that have been established through the PUC and CEC. The energy projections provided to the District for the AQMP include these conservation goals. All required conservation measures have been included in the energy projections for the plan.

The utility programs include rebates for energy efficient equipment such as lights, motors, pumps, boilers, and water heaters. They also offer energy audit and monitoring services to help business become more efficient, save energy and reduce costs. These programs and public service advertising are the way each utility achieves the energy conservation goals set for it by the PUC.

PROPOSED METHOD OF CONTROL

The proposed method of control is to provide incentives for businesses or residents to use energy efficient equipment in the District and increase the effectiveness of existing energy conservation programs. The District is proposing to develop and implement specific energy efficiency and conservation programs above and beyond the state and federal mandated programs to achieve further emission reductions. It should be noted that the impact of existing federal and state programs are already reflected in the District's projected emissions forecast.

Under this measure, monetary incentives could be provided to accelerate the retirement existing of equipment (e.g., boilers, water heaters) subject to AQMP rules and replacement of these equipment with high fuel efficiency units. Such approach will not only have the benefit of achieving early NOx reductions due to early compliance with NOx emission limits, but it will also provide additional NOx benefits based on the use of more fuel efficient equipment. The District will work with utility companies to provide additional incentives for property owners and businesses to purchase more fuel or energy efficient equipment. Funding for these programs could come from a variety of sources including the District Priority Reserve (District's Rule 1309.1) or mitigation fees (e.g., from federal sources). The District will conduct an assessment of the cost and the cost-effectiveness of specific energy efficiency and conservation measures before launching this program. Close coordination with vendors supplying high efficiency equipment as well as with local governments to explore opportunities to increase program outreach would be critical for the success of this program.

EMISSIONS REDUCTION

The amount of emission reductions will be determined during implementation of this control measure. Emission reductions will be in excess of reductions achieved by current regulatory programs.

Energy and environmental impacts of the proposed energy efficiency measure will be evaluated during the CEQA process as a part of the Final AQMP. Impacts on emissions of criteria air pollutants, electricity and fossil fuel demand and emissions of global warming gasses will be assessed in the CEQA document.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

Emissions quantification protocols will establish the appropriate test methods that applicable source categories will be required to use when generating and using emission credits under this program.

COST EFFECTIVENESS

The cost effectiveness has not been determined. In general, energy efficiency and conservation measures tend to be cost effective.

IMPLEMENTING AGENCY

The implementing agencies would include the District and local governments.

REFERENCES

ENERGY ACTION PLAN II: IMPLEMENTATION ROADMAP FOR ENERGY POLICIES, California Energy Commission and Public Utilities Commission, September 21, 2005

SUMMER 2006 ELECTRICITY SUPPLY AND DEMAND OUTLOOK, California Energy Commission, December 2005

APPLIANCE EFFICIENCY REGULATIONS, California Energy Commission,

Revised July 2006

ENERGY EFFICIENCY PROGRAMS IN SUPPORT OF THE GREEN BUILDING INITIATIVE, California Public Utilities Commission, October 2005

RENEWABLE ENERGY CERTIFICATES AND THE CALIFORNIA RENEWABLES PORTFOLIO STANDARD PROGRAM, California Public Utilities Commission, April 20, 2006

EMISSIONS REDUCTION FROM GREENWASTE COMPOSTING [VOC, PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	**GREENWASTE COMPOSTING**		
CONTROL METHODS:	**BEST MANAGEMENT PRACTICES AND/OR CONTROL TECHNOLOGIES**		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	TBD	TBD	TBD
PM2.5 REDUCTION		TBD	TBD
PM2.5 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Greenwaste composting is a biological process where greenwaste (organic waste generated from gardening, agriculture, and/or landscaping activities) is decomposed under controlled environment to produce a soil-like product called compost. Greenwaste composting is an important component of the solid waste industry; it provides resource conservation through source reduction, recycling, and reuse. However, it produces air emissions that are currently uncontrolled. Greenwaste composting is a source of direct dust and VOC (4.4 tons/day). It also releases carbon dioxide, water vapor, and methane, which are greenhouse gases. In addition, greenwaste composting can generate odors, a common public nuisance, if not properly operated. Emissions and odors from greenwaste composting can be reduced by maintaining optimal aerobic conditions thru best management practices, or utilizing ag-bag, enclosure, as well as state-of-the art emissions control technologies, such as aeration static pile (ASP) and in-vessel equipped with a control device such as bio-filter.

Background

Control Measure (CM) WST-02 – Emission Reductions from Composting, included in the 1997 and 2003 AQMPs, as well as the 1999 Amendments to the 1997 Ozone State Implementation Plan (SIP) for the SCAB, called for the development of feasible control strategies to reduce VOC and ammonia emissions from composting activities. As such, Rule 1133.2 – Emission Reductions from Composting Operations and Related Operations, was adopted in January 2003. Rule 1133.2 partially implements CM WST-02 because it only focused on controlling the emissions from co-composting operations (bio-solids).

Although the 2002 District's and the California Integrated Waste Management Board's (CIWMB) source testing revealed that greenwaste composting was a significant source of VOC, at that time, staff only proposed minimal registration requirements for greenwaste composting, with the intention to track their operations and emissions. According to staff's affordability analysis conducted in 2002, control options (enclosure, ASP, in-vessel, and bio-filter) identified for co-composting may have adverse impacts on the greenwaste composting industry despite their cost-effectiveness.

During the Rule 1133.2 development process, staff identified approximately 16 greenwaste composting facilities in the District's jurisdiction. Most of these facilities compost their greenwaste in long piles called windrows. In order to maintain optimal aerobic conditions, which would in turn, reduce emissions and odors generated during the decomposition process, windrows must be turned frequently by front-end loaders.

Regulatory History

Currently, operators of greenwaste composting facilities located in the District's jurisdiction are required to comply with the District's Rule 203 – Permit to Operate (for equipment that require permits), Rule 401 – Visible Emissions, Rule 403 – Fugitive Dust, and Rule 1133 (for registration and annual update).

Depending on the throughput levels, greenwaste composting facilities are either required to comply with the Local Enforcement Agency (LEA) Notification requirements set forth in Title 14, California Code of Regulations, Division 7, Chapter 5.0, Article 3.0, or obtain a Compostable Materials Handling Facility Permit from the CIWMB pursuant to Title 27, California Code of Regulations, Division 2, Subdivision 1, Chapter 4.0, Subchapters 1 and 3, Articles 1, 2, 3, and 3.1. However, neither the District nor state regulations require specific emission controls from the greenwaste composting industry.

Assembly Bill (AB) 939 (California Integrated Waste Management Act):

In September 1989, AB 939 was passed into law and was incorporated into the California Public Resources Code, Division 30, §40000 et seq. (Division 30). Division 30 is implemented by CIWMB. It mandates cities and counties to achieve a total waste diversion of 25 percent by 1995, and a total waste diversion of 50 percent by 2000, based on the 1990 baseline. Division 30 also requires California to secure a long-term disposal capacity. Organic waste (foodwaste and greenwaste) only accounted for approximately 30 percent of California's waste stream in

1999. Recycling, reuse, and source reduction have been widely promoted to achieve the overall AB939 diversion such goals.

Work conducted by CIWMB:

CIWMB conducted several source tests on greenwaste chipping and grinding, as well as composting in conjunction with similar work performed by the District. Studies have been commissioned by CIWMB to San Diego State University to evaluate greenwaste composting processes, including characterization of emissions (e.g., VOC, PM and NH3) and to UC Davis to evaluate anaerobic digestion technologies. CIWMB also conducted testing and studies on BMPs (i.e., feedstock controls, aeration techniques) and on biogenic emissions from greenwaste.

A greenwaste composting facility is also required to obtain or renew its Conditional Use Permit from the city and/or county offices in the jurisdiction where the facility is located.

PROPOSED METHOD OF CONTROL

The proposed control method will be divided into two phases:

Phase I - Review recent studies on emission factors and BMPs to refine inventories and to assess reduction potential.

Phase II – Program development including potential rule development to incorporate technical feasible and cost-effective BMPs or controls. Any future regulatory actions (e.g., reducing greenhouse gases) that provide concurrent reductions will be SIP creditable. The District will convene a working group involving all stakeholders to develop cost-effective and workable solutions for this source category.

EMISSIONS REDUCTION

The emission reduction potential for this measure is not determined at this time.

RULE COMPLIANCE

A District regulation or other enforceable instrument will be considered to ensure emission reductions. The most effective regulating tool will be selected based on the BMP options. Implementation of this control measure will not conflict with efforts under AB939.

TEST METHODS

District staff will work with CIWMB to develop appropriate test methods, based on BMPs.

COST EFFECTIVENESS

Cost-effectiveness for BMPs will be determined during rule development process.

IMPLEMENTING AGENCY

AQMD with consultation of CIWMB.

REFERENCE

Technology Assessment for Proposed Rule 1133: Emission Reductions from Composting and Related Operations, AQMD, March 13, 2002.

EMISSION REDUCTIONS FROM LIVESTOCK WASTE [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	LIVESTOCK WASTE		
CONTROL METHODS:	BEST MANAGEMENT PRACTICES, FEED VARIATIONS, CONTROL DEVICE INSTALLATION		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	9.4	3.7	3.0
VOC REDUCTION		0.8	0.6
VOC REMAINING		2.9	2.4
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	9.4	3.7	3.0
VOC REDUCTION		0.8	0.6
VOC REMAINING		2.9	2.4
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD WITH THE COOPERATION OF STATE AND LOCAL RESOURCE AGENCIES		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to seek emission reductions from confined livestock facilities.

Background

Livestock waste emissions are precursors to both ozone and fine particulates (PM2.5). Although confined animal facilities have been relocating out of the District's jurisdictional boundaries for years the District, in 2002, still retained over nine million poultry (egg layers and broilers) and more than 15,000 hogs and pigs (swine), and an estimated 400,000 cows, of which approximately 250,000 are dairy cattle and approximately 150,000 are support cattle (dairy). Additional VOC and NH3 emission reductions could be achieved by requiring control actions above those required by Rule 223 (Emission Reduction Permits for Large Confined Animal Facilities) by applying similar requirements to facilities not large enough to be subject to the rule. Further emission reductions could also be achieved from amendments to Rule 1127 (Livestock Waste) based on mitigation measures recently developed.

Source Description

The following information was obtained from a report prepared for the US EPA (US EPA, August, 2001). Laying hens or layers are sexually mature female chickens maintained for the production of eggs, primarily for human consumption. These eggs are known as table eggs and may be sold as shell eggs, or may be used in the production of liquid, frozen, or dehydrated eggs. Laying hens maintained for table egg production are almost exclusively confined in cages, which allow automation of feed distribution and egg production. Most confinement facilities for laying hens are mechanically ventilated to remove moisture and carbon dioxide produced by respiration. Exhaust fans draw air into the building through slots located along the perimeter of the roof under the eves. Manure is typically collected at commercial egg-production facilities in two types of laying hen houses. One is a manure belt house where manure is collected as frequently as daily but typically every three to four days and stored in open storage piles. The other type of laying hen house is referred to as a high-rise where manure accumulates below the laying hen houses and is collected on an annual or semi-annual basis. At either facility manure is spread on the ground to allow the material to dry before it is sold or delivered as fertilizer.

Swine (hog) operations can be of several types. The most common is the farrow-to-finish operation that encompasses all three phases of swine production (farrowing, nursing, and finishing). The animals are typically housed in confinement buildings that are either totally enclosed or open-sided with curtains. Totally enclosed facilities are mechanically ventilated throughout the year. Open-sided buildings are naturally ventilated the majority of the year, but may be mechanically ventilated when the curtains are closed due to weather conditions. Manure may be flushed from the floor of the housing or fall through slats in the floor to a pit underneath the floor. Manure in the pit may be flushed or scraped (SJVUAPCD, 2006).

Most dairy facilities in the Basin are “dry lot corral” dairies. Dairy cows live in open corrals, with feed lanes usually along one side of the corral. Manure is generally cleared from the feed lane into the corral and then periodically removed from the corral to one-site stockpiles to off-site locations or spread on cropland at the dairy as a soil amendment. The high concentration of animals per acre of land results in a large volume of manure stored in corrals and stockpiles. Because most dairy operations are clustered in a relatively small area with a high density of dairy livestock herds, substantial amounts of manure are produced in a concentrated area (SCAQMD, 2004).

Data from the UC Cooperative Extension indicates that there are 34 active laying-hen poultry facilities within the jurisdictional boundaries of the District. All of these facilities are located in Riverside and San Bernardino County. In total, these facilities have approximately 8.4 million egg-producers, commonly referred to as layers. According to the UC Cooperative Extension, there are also seven confined pullet (also referred to as young hens, usually less than one year old) facilities (Kuney, 2005). The District’s permitting data indicates that there are four egg production facilities that are defined as Large Confined Animal Facilities (LCAFs) but that there currently are no swine production facilities that have permits. According to 2002 data, there are approximately 300 dairies in the Basin, mostly located in the Chino/Ontario area (SCAQMD, 2004). The industry is expected to experience negative growth in the coming years as many dairy facilities have initiated two to five year escrows (Nathan DeBoom, 2006).

Emissions

Emission factors are a critical part of emission calculations and there is a fair amount of discrepancy relative to the emission factors by different jurisdictions for different type of operations. Due to ongoing research, these numbers may change as more detailed research data is made available. The interim emission factors currently used by District staff for calculating emissions from layer hens and swine operations are provided. It should be pointed out that for certain chicken farm operations the applicable emission factors from ammonia can be ten times as high as the emission factors shown in the Table below that could potentially increase the emissions inventory for ammonia from these operations by an order of magnitude.

Emission Factors

	Ammonia (lb/hd/year)		VOC (lb/hd/year)
Layer Hens[4]	0.096		0.02565
Swine	20.3		4.6[5]

To improve the current emission factors, further studies are currently being conducted at different locations. It is anticipated that improved emission rate data will be available prior to implementation of this control measure.

Regulatory History

Agricultural operations represent a significant source of air pollution throughout the state. SB 700, which was enacted into law as of January 1, 2004, eliminated the exemption from the permit system of local air pollution control districts for agricultural operations in the farming of crops or raising of fowl or animals. The bill amended air pollution control requirements in the California Health & Safety Code to include requirements for agricultural sources of air pollution.

Rule 223 was adopted in June of 2006 to satisfy the SB 700 requirement that all Large Confined Animal Facilities (LCAF) have permits that seek to minimize their emissions. Rule 223 requires that all LCAFs apply for and obtain a permit that includes a mitigation plan that the LCAF will implement to reduce emissions. Rule 223 requires compliance with Best Available Retrofit Control Technology (BARCT) when developing mitigation plans but does not mandate any specific measure.[6] To serve as interim BARCT guidelines, Appendix A of Rule 223 contains a list of the Emission Mitigation Measures for use by applicants when developing a mitigation plan. This list was developed in consultation with and general agreement of stakeholders, including Western United Dairymen, Milk Producers Council, Inland Empire Poultrymen, Inc. and Pacific Egg and Poultry Association. The Rule 223 Appendix A list of measures includes both Class One Mitigation Measures and Class Two (more stringent) Measures.

[4] Rule 223 Draft Final Staff Report, South Coast Air Quality Management District, June 2006.
[5] Rule 4570 Draft Final Staff Report, San Joaquin Valley Unified Air Pollution Control District, May 2006.
[6] BARCT is defined as an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

Rule 1127 was adopted in August of 2004 to reduce emissions from dairy farms and the disposal of manure by requiring on-dairy best management practices (BMPs) and removal of surplus manure from corrals and stockpiles 4 times per year. The rule exempts small dairies or related farms with fewer than 50 animals on-site and does not establish performance standards (e.g. higher frequency of manure removal.)

PROPOSED METHOD OF CONTROL

Depending on the ultimate size of the emissions inventory, this control measure would aim to mandate the Class Two Mitigation Measures of Rule 223, with a higher level of overall control efficiency for the larger facilities and seek reductions from the smaller facilities not subject to Rule 223, possibly through requirements to implement Rule 223 Class One Mitigation Measures. Examples of Rule 223 Class Two Mitigation Measures for poultry facilities include:

- Use of a belt litter removal/drier system, or use a tunnel ventilated houses, or litter drying systems

- Store manure in an enclosure vented to a control device

Additional research has quantified emission reductions potential from manure management practices. For example, in poultry buildings (cages) removing manure twice a week using belts or weekly with drying manure on belts has been estimated to reduce NH3 emissions from battery cage houses by 60 percent or more. Removing NH3 from vented air using filters or scrubbers (water and acid) is feasible where barns are mechanically ventilated. In poultry buildings, exhaust air can be cleaned using bioscrubbers, biofilters, or chemical scrubbers, however, the practical applications of these devices may be limited by cost and technical feasibility due to dust in poultry and swine houses (Arogo, J., et al). Chemical additions can also be applied to manure during collection to reduce ammonia emissions by lowering the pH. For example, field tests indicate that alum can reduce ammonia emissions by 75-97 percent when added to poultry litter; however, alum also increases nitrogen content of litter, potentially increasing ammonia loss during field application (Moore et al, 2000).

Currently, Rule 223 does not have any Class One or Two Measures for swine production; however, similar measures (e.g., manure management) could be developed.

For dairies, this control measure would also aim to strengthen and expand mitigation methods listed in Rule 223 for dairy farm manure and on BMPs listed in Rule 1127. Recent scientific research indicates that additional VOC reductions are feasible through manure management practices, including mitigation measures such as acid application to dry lot dairies, lowering the pH of wastewater lagoons, and feed modification. The control measure would also aim to apply performance standards to both large and small dairy facilities.

EMISSIONS REDUCTION

Emission reductions associated with this control measure would depend on the control strategy pursued and will be quantified in conjunction with an evaluation of the existing emission factors for this source category.

A 20 percent reduction is anticipated for poultry and swine operations due to improved manure management practices. A minimum 20 percent level of control for dairy manure management practices is also expected. Emission reductions from dairies are considered to have a longer term emission reduction benefit, whereas reductions for swine and poultry are more of a short term nature.

RULE COMPLIANCE

Compliance with this control measure can be monitored through recordkeeping and inspections.

TEST METHODS

The appropriate test methods for this control measure would depend on the control strategy implemented.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost-effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001).

REFERENCES

Arogo, J., et al, Ammonia Emissions from Animal Feeding Operations, White Paper prepared for the National Center for Manure and Animal Waste Management, North Carolina State University, Raleigh, N.C.

Kuney, Doug, UC Cooperative Extension, personal communication with Mike Laybourn, February 2005.

Moore, P and J Meisinger, 2003, Air Quality Issues: Poultry. Working paper in J. Hatfield (ed.), Air Quality Primer, Draft Report.

Nathan DeBoom, Milk Producers Council, Personal Communication with District staff.

SCAQMD, Final Draft Staff Report for Proposed Rule 1127 – Emission Reductions from Livestock Waste, August 6, 2004.

SJVUAPCD (San Joaquin Valley Unified Air Pollution Control District), Final Draft Staff Report for Proposed Rule 4570 – Confined Animal Facilities, May 18, 2006.

US EPA, Emissions from Animal Feeding Operations, Contract No. 68-D6-0011, Draft, August 2001.

IMPROVED START-UP, SHUTDOWN AND TURNAROUND PROCEDURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ALL SOURCES CATEGORIES
CONTROL METHODS:	OPERATIONAL PROCEDURES
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

Equipment start-up, shutdown and turnaround are typically associated with significantly higher emission rates compared to the emission rates observed from the same equipment operating under steady state or normal operating conditions. The higher emission rates observed during start-up, shutdown and turnaround are in part due to the higher loads equipment are subjected to during these transient operating conditions compared to the normal operating conditions as well as the lead times necessary for the conditioning of certain control technologies. The emission rates observed during start-up, shutdown and turnaround, in addition to the equipment design, are influenced by the speed by which a particular equipment is fired to reach normal operating conditions or taken out of service. Start-up, shutdown or turnaround, often adversely impact the emission rates from equipment that are interconnected, either upstream or downstream to equipment undergoing start-up/shutdown. This is a phenomenon commonly observed in refinery operations and chemical plants that rely on interconnected equipment and processes. Refinery operations predominantly rely on flares to minimize the emissions impact resulting from start-up, shutdown and turnarounds. However, there are adverse environmental impacts associated with the use of flares as well.

On November 4, 2005 the District's Governing Board adopted an amendment to Rule 1118 - Control of Emissions from Refinery Flares. In an effort to minimize flaring and associated emissions, the amendment established declining emission targets over time that each refinery operation had to meet. The amendment eliminated the flaring of vent gases except for those resulting from emergencies, shutdowns and startups, turnarounds and essential operational needs. The amendment also established operational requirements of diagnostic practices to minimize flaring.

Reducing flaring and associated emissions continued to be an area of intense interest by the community, regulators as well as industry. The Rule 1118 staff report listed several possible alternatives of minimizing flare emissions that could be incorporated further explored:

- Optimization of turnaround schedules
  Coordination of turnaround schedules for different units can result in minimizing emissions associated with these periodic maintenance activities.

- Developing startup and shutdown procedures that do not increase emissions
  For certain units, it is possible to develop procedures that avoid flaring during shutdown and startup, such as using reduced loads, recycling feeds, better decontamination procedures, etc. Sometimes more time is necessary for a startup or shutdown, or physical modifications to achieve this purpose.

Several of these approaches are also applicable to other types of industries in minimizing these types of operations. For example, the installation of redundant equipment to increase reliability and the promotion of operator training for environmental awareness could help a particular facility in minimizing the number of start-ups and shutdowns within a given operational cycle.

PROPOSED METHOD OF CONTROL

Conduct analysis to identify improved operating procedures, that minimize or eliminate the emissions impacts in either start-up, shutdown or turnaround and develop rule amendments that could seek implementation of best management practices and/or additional hardware.

EMISSIONS REDUCTION

Implementation of the control measure is expected to result in emission reductions. The magnitude of these reductions cannot be readily quantified at this time.

RULE COMPLIANCE AND TEST METHODS

Compliance would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Not Determined.

IMPLEMENTING AGENCY

The District has authority to establish procedures for the purpose of minimizing or eliminating emissions during equipment start-up, shutdown and turnaround.

REFERENCES

Final Staff Report, Proposed Amended Rule 1118 – Control of Emissions from Refinery Flares, October 2005.

APPLICATION OF ALL FEASIBLE MEASURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ALL SOURCE CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

This control measure addresses the attainment of further emission reductions through the amendment of existing rules and regulations. In particular, existing regulations on VOC coatings and solvents would be targeted for further emission reductions as well as rules and regulations for other pollutants such as NOx and SOx.

Regulatory History

The California Clean Air Act (CCAA) requires districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures Health and Safety (H&S) Code (H&S §§40913, 40914, and 40920.5). The term "feasible" is defined in the 14 California Code of Regulations, section 15364, as a measure "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." The required use of best available retrofit control technology (BARCT) for existing stationary sources is one of the specified feasible measures. H&S Code §40440 (b)(1) requires the District to adopt rules requiring best available retrofit control technology for existing sources. H&S Code §40406 specifically defines BARCT as "…best available retrofit technology means an emission limitation that is based on the maximum degree of reduction achievable taking into account environmental, energy, and economic impacts by each class or category of source."

The BARCT assessment for RECLAIM sources is made in conjunction with the approximate 3-year cycle of the AQMP. Any applicable BARCT identified during the AQMP would then be subject to the rulemaking process. In January 2005, the Board adopted further reductions to RECLAIM Allocations starting Compliance Year 2007 to implement BARCT. Reductions would proceed until the 2011 compliance year. The total NOx reduction from the RECLAIM facilities was determined to be 7.7 tons per day. As such, RECLAIM is designed to achieve the same level of emissions reductions as would have been achieved in aggregate by implementing the subsumed rules and command-and-control measures as well as complying with state law,

such as California Health and Safety Code §39616(e). The BARCT associated with the January 2005 amendment was identified in Control Measure CMB-10 in the 2003 AQMP.

Existing rules and regulations on VOC coatings and solvents as well as regulations for pollutants such as NOx, SOx and PM reflect current BARCT. However, BARCT is ever evolving as new BARCT becomes available that is feasible and cost-effective. Through this control measure, the District commits to the adoption and implementation of the new retrofit control technology standards.

CONTROL METHOD

The District will continue to review new emission limits introduced through federal, state or other local regulations to determine if District regulations remain equivalent or more stringent than other regions. If not, a rulemaking process will be initiated to perform BARCT analysis with potential rule amendments if deemed appropriate. In addition, the District will continue to monitor technology advances in order to implement new BARCT where applicable.

For RECLAIM it is anticipated that BARCT technology would evolve in the next 10 to 15 years. In addition, facilities in the RECLAIM program are required to install BACT if RECLAIM NSR is triggered. This phase of the control is to further reduce the RECLAIM allocations to reflect future BARCT and any BACT installations due to RECLAIM NSR requirements. In addition, during rule development for Control Measure #2007MCS-01, its applicability to the RECLAIM program will also be examined to ensure equity between RECLAIM and non-RECLAIM sources.

PROPOSED METHOD OF CONTROL

Adopt and implement new retrofit technology control standards that are feasible and cost-effective as new BARCT standards become available in the future.

EMISSIONS REDUCTION

Further emission reductions would be sought from the amendment of existing rules and regulations to reflect new BARCT standards, but may become available in the future. This control measure would act as an intermediary control measure between now and 2023 to achieve further emission reductions on a faster timeline than long-term control measures calling for further emission reductions from the amendment of existing rules and regulations starting in 2020.

Based on historical advancements in control technology and RECLAIM's fair share in the 2024 ozone attainment demonstration, it is anticipated that the reductions would range from 3 to 5 tons per day.

RULE COMPLIANCE AND TEST METHODS

Compliance with this measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In

addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectives for this control measure cannot be determined because "all feasible" measures are not known. However, the most cost-effective control strategy using the newest control technologies would be sought. The District will continue to analyze the potential cost impact associated with implementing this control measure, conduct research on the newest control technologies, and provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

40 CFR Part 51.858.

Health and Safety (H&S) Code: §§40913, 40914, 40920.5, §40406, and §40440 (b)(1)

14 California Code of Regulations, section 15364

CLEAN AIR ACT EMISSION FEES FOR MAJOR STATIONARY SOURCES [VOC AND NOx]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	STATIONARY SOURCES OF VOC AND NOX WITH POTENTIAL TO EMIT OVER 10 TONS PER YEAR
CONTROL METHODS:	EMISSION FEES
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	SEE COST EFFECTIVENESS SECTION
IMPLEMENTING AGENCY:	AQMD, POSSIBLY REQUIRING ADDITIONAL LEGISLATION

DESCRIPTION OF SOURCE CATEGORY

Regulatory History

This control measure was first introduced in the 1994 AQMP and then carried over to the 1997 AQMP and then the 2003 AQMP.

On December 22, 2006, the federal Court of Appeals in Washington, D.C., ruled that EPA did have the authority to revoke the one-hour ozone standard. Therefore, the 2007 AQMP does not need to demonstrate attainment of the one hour standard. However, the court also ruled that EPA must require areas that had not yet attained the one-hour standard to continue to implement control requirements at least as stringent as those in effect under the one-hour standard. In particular, one-hour ozone NSR and conformity provisions must continue to be implemented. In addition, if a severe or extreme area fails to attain the one hour standard by the statutory date, the area must implement a measure requiring major stationary sources to either reduce their emissions to 80% of what they were in the attainment year, or pay an annual fee of $5,000 (adjusted for inflation) for each ton in excess of 80% of the baseline.

The $5,000 (1990 dollars) per ton fee applies to every "major stationary source" of VOC emissions, whether permitted or not. The definition of major stationary source is any source with a "potential to emit" of 10 tons per year, not just sources with actual emissions of ten tons per year. Therefore, the fee should be based on total actual emissions, not just permitted emissions. However, fugitive emissions are not included in determining potential to emit (PTE) unless the sources is one of the types of facilities listed in 40 CFR Part 70, section 70.2. If the facility is already a major source, then fugitive emissions would be included in its total emissions. If the facility has taken a synthetic minor permit limiting them to less than 10 tpy, then these facilities would not be subject to the fee.

It should also be noted, pursuant to section 182(f) of the federal Clean Air Act, the plan provisions required under this subpart, which includes the fee, which are applicable to major stationary sources of VOC are also applicable to major stationary sources of NOx. That is, unless EPA finds that additional reductions of NOx would not contribute to attainment. On this basis, it is assumed that the fee applies to major NOx sources as well. The intent of this

measure is to implement the 2006 court decision. EPA has filed a petition for a rehearing. Implementation of this control measure would be modified to reflect a future court ruling.

PROPOSED METHOD OF CONTROL

The l990 federal Clean Air Act requires that the AQMP include all control measures, means or techniques, including economic incentives such as fees, as may be necessary to reach attainment. Further, the Act requires that all stationary sources of VOC emissions (with PTE greater than 10 tons per year) in an extreme nonattainment area that has failed to attain the ambient air quality standard for ozone pay a fee as a penalty for such failure (Title I, Section 185).

This control measure proposes that if the former federal 1-hour ozone ambient air standard is not met by the year 2010, the District shall impose an emissions fee of $5,000 (1990 dollars) per ton of VOC, emitted by each major source in excess of 80 percent of the sources 2010 emissions beginning in 2011. The fee rate will be adjusted to reflect increases in Consumer Price Index (CPI) since 1990 and annually to reflect increases in the CPI. The fee shall be paid for each calendar year after the year 2010 and until the area meets the 1-hour ozone standard. This fee will be in addition to the annual emission fee required by District Rule 301.

EMISSIONS REDUCTION

Implementation of this measure is expected to result in emission reductions as facilities seek to further reduce emissions to reduce the fees proposed by this measure. Projected emission reductions are uncertain at this time, and require further analysis.

TEST METHODS

The EPA and AQMD approved test methods for this measure include:

EPA METHOD 24 – DETERMINATION OF VOLATILE MATTER CONTENT,WATER CONTENT, DENSITY, VOLUME SOLIDS, AND WEIGHT SOLIDS OF SURFACE COATINGS

EPA METHOD 25 – DETERMINATION OF TOTAL GASEOUS NONMETHANE ORGANIC EMISSIONS AS CARBON

EPA METHOD 7E – DETERMINATION OF NITROGEN OXIDES EMISSIONS FROM STATIONARY SOURCES (INSTRUMENTAL ANALYZER PROCEDURE)

AQMD METHOD 25.1 – DETERMINATION OF TOTAL GASEOUS NON-METHANE ORGANIC EMISSIONS AS CARBON

AQMD METHOD 25.3 – DETERMINATION OF LOW CONCENTRATION NON-METHANE NON-ETHANE ORGANIC COMPOUND EMISSIONS FROM CLEAN FUELED COMBUSTION SOURCES

AQMD METHOD 100.1 – INSTRUMENTAL ANALYZER PROCEDURES FOR CONTINUOUS GASEOUS EMISSION SAMPLING

Additional or alternative test methods, protocols and guidelines may be used provided they are approved by EPA, ARB and AQMD.

COST EFFECTIVENESS

There would be an emission fee of $5,000 (1990 dollars) per ton of VOC and NOx emitted by each major source in excess of 80 percent of each source's baseline emissions.

IMPLEMENTING AGENCY

This measure will be implemented to give affected sources the option of reducing their emissions to 80% of baseline emissions or paying the fee on every ton above 80%. As such, the District has authority under H & S 40001 (rules to attain standards) to implement this measure.

REFERENCES

South Coast Air Quality Management District. Rule 301 - Permit Fees. Amended June 1993.

GROUP 6

Compliance Flexibility Programs

ECONOMIC INCENTIVE PROGRAMS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ALL SOURCE CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

This control measure is designed to enhance the District's existing regulatory programs to maximize compliance flexibility, minimize compliance costs, and to promote the commercialization of advanced pollution control technologies. In concept, this control measure proposes to expand the existing trading market to allow broader trading of mobile and stationary source emission credits, develop pilot credit trading rules between mobile and stationary sources including potential credits for new source review, develop clean air investment funds and other market incentive approaches.

Background

In April 1995 the District conducted the Intercredit Trading Study to assess the existing market-based regulatory programs and to identify potential enhancements for cost-effective air quality solutions. After a series of public workshops and public meetings the District staff presented a white paper titled, "Intercredit Trading Study - Proposed Recommendations and Action Plan" to its Governing Board in March 1996. This paper identified specific enhancements to the existing regulatory program that would provide additional compliance flexibility while promoting the commercialization of advanced pollution control technologies.

The 1997 AQMP included control measure FLX-01 formerly titled, "Intercredit Trading." The 1997 AQMP control measure was based on recommendations from the Intercredit Trading Study white paper and presented concepts for developing a universal trading market with stationary and mobile sources.

Over the past decade, the District has adopted a series of programs that incorporate a variety of different market incentive approaches such as emissions trading programs, mitigation fee programs, clean air investment programs, and averaging. Staff will continue to work collaboratively with EPA, ARB, industry and other interested parties to expand trading programs and address issues related to economic growth and compliance flexibility.

Emissions Trading Programs

Emissions trading programs include programs where emissions trading credits are generated by one source and used by another. Emission reduction credits are used in a variety of District programs. Under Regulation XIII – New Source Review, emission reduction credits (ERCs) are

used to offset emission increase from new and modified sources. Some Regulation XI – Source Specific Rules, Regulation XX – RECLAIM and Rule 2202 allow the use of mobile source emission reduction credits (MSERCs) as a compliance alternative. MSERCs must be generated pursuant to an approved emission reduction protocol.

Mitigation Fee Programs

The concept of the mitigation fee program is to allow sources to pay a specified dollar per pollutant fee in lieu of directly complying with an emission limit. The fee would be used to generate emission reductions. The use of a mitigation fee approach was introduced in Rule 1121 – Residential Gas-Fired Water Heaters. Under Rule 1121, water heater manufacturers can pay a mitigation fee of $2.70 per pound NOx emission reductions that can be used in lieu of directly complying with the NOx emission limits. The mitigation fee under Rule 1121 is temporary, and is allowed as an alternative to complying with an interim NOx emission limit. Similar approaches may be considered in future rulemaking to provide certain compliance flexibility and to facilitate the adoption of technology-forcing limits. The mitigation fee concept has also been incorporated into Rule 1118 – Control of Emissions from Refinery Flares and Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components of Petroleum Facilities and Chemical Plants, providing additional disincentives against releases from flares and pressure release devices at refineries and chemical plants.

Air Quality Investment Programs

The concept of the Air Quality Investment Program (AQIP) is based on sources paying a fee to the District that is used to fund emission reduction projects. The District is responsible for obtaining emission reductions.

The District has three types of air quality investment programs, under Rule 2202 - On-Road Motor Vehicle Mitigation Options and Rule 2020 – RECLAIM Reserve and Rule 1309.1. Under Rule 2202, facilities have the option to pay into an AQIP to purchase emission reductions to meet specified ridesharing requirements. The Rule 2202 AQIP has funded a variety of mobile source emission reduction control strategies from on-road vehicles, off-road vehicles, and marine vessels. To date, the Rule 2202 AQIP has generated 2,882 tons of NOx, 16,991 tons of CO, and 2,846 tons of VOC emission reductions.

In response to the energy crisis of 2001/2002, the District amended Rule 1309.1 – Priority Reserve to open up new source review emission reduction credits to electric generation facilities for expansion and growth. Operators of electric generation facilities were required to pay into a mitigation fee program which was then used to fund projects that mitigated the emission increases resulting from the expansion or growth.

The Rule 2020 AQIP was a temporary AQIP of NOx emission reductions for RECLAIM facilities that met specific participation requirements. Provided there were NOx emission reductions available, certain RECLAIM facilities could pay $7.50 per pound of NOx to meet their annual allocation requirements. The Rule 2020 AQIP relied on mobile source emission reduction protocols under the pilot credit generation programs of Regulation XVI.

Other Market Incentive Approaches

Other types of market incentive approaches include averaging and banking. The concept of emissions averaging is based on averaging emissions to meet an overall emission limit. Rule 1113 – Architectural Coatings includes a provision that allows manufacturers' to average emissions from different coatings to comply with an overall emission limit. The concept of banking is based on saving emission credits generated in one year for use in another year. EPA has included an averaging and banking approach as an alternative to complying with emission limits for marine vessel standards under 40 CFR Part 94. The averaging provision allows engine manufacturers to certify one or more engine families above the applicable emission standard provided the emissions increase is offset by one or more families certified below the emission standard. The banking provision allows engine manufacturers to generate emission credits to bank for their future compliance use or another manufacturers' use.

Regulatory History

In 2001, the District adopted six mobile and area source pilot credit generation rules: Rule 1612.1 – Mobile Source Credit Generation Pilot Program; Rule 1631 – Pilot Credit Generation Program for Marine Vessels; Rule 1632 – Pilot Credit Generation Program for Hotelling Operations; Rule 1633 – Pilot Credit Generation Program for Truck/Trailer Refrigeration Units; Rule 1634 – Pilot Credit Generation Program for Truck Stops; and Rule 2507 – Pilot Credit Generation Program for Agricultural Pumps. NOx emission reductions generated from these pilot credit generation rules could be used in the RECLAIM program either directly or through the RECLAIM Reserve for the Mitigation Fee Program for power producing facilities or the Rule 2020 AQIP for specific RECLAIM facilities. The six pilot credit generation rules, Rules 1612.1, 1631, 1632, 1633, 1634, and 2507 have been approved by CARB and EPA. However, because of sunset provisions in each rule, all pilot credit generation rules have now expired and can no longer be used to generate MSERCs.

Economic Incentive Guidelines

In January 2001, the EPA finalized their guidance document for "Improving Air Quality with Economic Incentive Programs" (EIP). The EIP is designed to encourage cost-effective innovative approaches to achieving air pollution goals. The guidance document outlines economic incentive programs that states and local areas may incorporate in their State Implementation Plans for meeting air quality standards.

The EIP outlines four main types of economic programs: emissions trading programs, financial mechanism programs, clean air investment funds, and public information. The EIP also outlines key principles that must be incorporated in an economic incentive program to receive EPA approval such as the integrity of emission reduction credits, protection of health and welfare from use of emission credits, and assurance of an environmental benefit.

Federal Clean Air Act

Since 1970, the federal Clean Air Act has required that states adopt regulations designed to attain ambient air quality standards. The Act generally has allowed the states to choose the appropriate type and mix of control strategies used to achieve attainment. In 1977 and 1990

Congress amended the Act to specify certain emission control requirements that each state regulatory program must impose. Nevertheless, the basic concept that states may choose the appropriate type and mix of control strategies has been retained as long as the specific control requirements of the Act are met (Sections 110, 172, and 182). Thus in general, the federal Clean Air Act does not prohibit the District from expanding or linking emissions trading programs.

EPA has promulgated rules for economic incentive programs (EIPs) which either may or must be adopted by States for certain ozone and carbon monoxide nonattainment areas upon the failure of States to submit an adequate showing that an applicable reasonable further progress (RFP) milestone has been met pursuant to CAA Section 182(g)(3) and (5). These rules require that EIPs be submitted to the EPA for approval as part of the SIP and that they contain provisions to ensure the following: (1) the program will not interfere with other CAA requirements; (2) emission reductions credited are quantifiable; (3) creditable emission reductions are consistent with SIP attainment and RFP demonstrations; (4) reductions are surplus to reductions required by, and credited to, other SIP provisions in order to avoid double-counting of reductions; (5) the program is enforceable by State and Federal authorities; and (6) all creditable emission reductions are permanent. (See 40 Code of Federal Regulation (CFR) Sections 51.490 to 51.494 and 59 Federal Regulation (FR) 16690 et seq., April 7, 1994).

One approach where the U.S. EPA allows emission reductions from voluntary mobile source retrofit program to claim SIP credits is with the Voluntary Mobile Source Emission Reduction Policy (VMEP). Under this policy, states are allowed to claim, in their SIPs, up to three percent of the reductions necessary to meet their air quality goals from voluntary mobile source emission reduction programs. Emission reductions from retrofit programs of highway vehicles can also be used in transportation conformity analysis if the reductions are not included in the SIP.

PROPOSED METHOD OF CONTROL

This control measure is a voluntary program to provide additional compliance flexibility to regulated sources in the Basin, provide incentives for the early installation and commercialization of advanced pollution control technologies, and lower overall compliance costs. All existing economic incentive programs discussed in the previous section may be used to further the clean air objectives. The District will continue to evaluate source categories and strategies for future pilot credit generation programs and the potential to expand the program to generate alternative short-term offsets or credits for NSR purposes. In conjunction with other measures, this measure may also use fees collected from other market incentive programs to create a 'Moyer"-type stationary program to incentivize early implementation of control technologies. Furthermore, within the District's programs (e.g., Regulation III) a fee schedule based on the VOC content or emission rate may be explored. The District is currently working on an architectural coating fee program to recover the costs regulating this industry. The proposed concept is under review.

EMISSIONS REDUCTION

Due to the voluntary nature of this control measure, potential emission reductions associated with the early introduction of advanced pollution control technologies cannot be quantified. Implementation of compliance flexibility program would not necessarily result in direct emission reductions since emission reductions associated with credit generation activities would be offset by the use of the emission credits. However, emission fee programs may generate reductions that are otherwise not allowable through traditional regulation programs. Innovative offset program encourage new sources employing the best available control technologies that cleaner than retrofit technologies. These emission benefits can only be claimed retrospectively through SIP revisions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements. Recently, U.S. EPA provided some guidance on tracking and reporting reductions associated with voluntary programs. The District will work with U.S. EPA to incorporate necessary requirements for SIP crediting purposes.

Emissions quantification protocols will establish the appropriate test methods that applicable source categories will be required to use when generating and using emission credits under this program.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not been determined. Since this measure is voluntary, implementation of this control measure is expected to reduce the overall cost of compliance with District rules and regulations. Implementation of this control measure is expected to maximize trading opportunities and provide sources with more cost-effective compliance methods. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to regulate stationary emissions sources such as refineries.

REFERENCES

South Coast Air Quality Management District. "Intercredit Trading Study. Proposed Recommendations and Action Plan." January 1996.

PETROLEUM REFINERY PILOT PROGRAM [VOC, PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	EMISSION SOURCES IN THE SUBSUMED CONTROL MEASURES		
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	7.4	5.5	5.5
VOC REDUCTION		0.7	1.6
VOC REMAINING		4.8	3.9
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	7.4	5.5	5.5
VOC REDUCTION		0.7	1.6
VOC REMAINING		4.8	3.9
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	2.4	2.2	2.2
PM2.5 REDUCTION		0.4	0.4
PM2.5 REMAINING		1.8	1.8
CONTROL COST:	$12,800 PER TON VOC AND PM2.5 REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

In the 2003 AQMP there was a recommendation to provide more flexibility to existing stationary source rules by allowing sources to achieve their reduction obligations by reducing emissions from on-site or off-site projects. A three-step process was proposed to implement this strategy. Step one would identify specific source categories and facilities or sources that would be subject to additional controls under any portion of this AQMP. Step two would include an identification of superior and more cost-effective strategies for one or more existing sources whose emissions occur within or otherwise impact the Basin. The final step would be to craft regulations which would offer facilities the flexibility to select from a menu of control options to comply with their emission reduction obligations as identified in the AQMP. The purpose of this program is to achieve emission reductions and environmental improvement in a less costly and more efficient manner and, through compliance flexibility, to minimize the economic and job-related impacts of the Plan and potentially to reduce the size of the black box.

The District initiated a collaborative multi-stakeholder process to consider whether to implement this approach as a pilot program for the refineries in the Basin. This process has been on-going since the initial July 2005 Working Group meeting. Based on the results of this process, the District would consider adoption of a pilot program. An appropriate environmental review would be performed prior to adoption of any pilot program. If such a program is adopted, then upon achieving at least the equivalent reductions, the pilot program would subsume control measures and reduction obligations proposed in the 2007 AQMP for the refinery sector. Subsumed control measures include FUG-01: Improved Leak Detection and Repair, FUG-04: Emission Reductions from Pipeline and Storage Tank Degassing; BCM-01: PM Control Devices; MCS-01: Facility Modernization; MCS-06: Shutdown and Turnaround Procedures; and MCS-07: Application of All Feasible Control Measures.

The implementation of this pilot program does not preclude future adjustments to the overall reduction targets established for this source category if warranted by changes in refinery emission inventories, applicable air quality standards, or attainment demonstrations in future SIP revisions.

Regulatory History

Currently, the District has a number of source specific rules to reduce emissions from refinery operations. Refineries are also subject to Reg XIII when triggered. Further reductions are necessary from this industry to meet the PM2.5 and ozone air quality standards. This measure seeks an alternative means to achieve reduction obligations, including long-term reductions.

PROPOSED METHOD OF CONTROL

This control measure is a voluntary program to provide additional compliance flexibility to regulated sources in the Basin. Refineries that choose to participate in the program may seek reduction opportunities either from on-site or off-site VOC sources. In addition to the VOC emission reduction obligation refineries would also implement an on-site or at related port facilities diesel reduction strategy surplus to other regulatory requirements to address community concerns regarding potentially foregone toxic reduction inherent in on-site VOC control strategy. Potential candidates for emission reductions could include sources within and adjacent to refinery properties, such as ports, rail yards, container operations, heavy duty truck and cargo marshalling areas, warehouses and truck stops, as well as other mobile or stationary sources within the SCAB. Non-participating facilities would remain subject to the otherwise-applicable AQMP control measures. The district would develop facility-specific rule to incorporate enforceable commitment by participating refineries. Reductions need to be real, quantifiable, surplus, enforceable, and permanent. Reduction quantification and monitoring, recordkeeping, and reporting protocols need to be approved by the District, CARB and EPA.

The District would also develop backstop rules should participating refineries elect to exit the pilot program to ensure the SIP obligation continues to be met. In addition, the petroleum refinery stakeholders requested consideration for a mitigation fee option.

EMISSIONS REDUCTION

The overall emission reduction is 1.6 tpd of VOC by 2023. The PM2.5 reduction is estimated to be 0.44 tpd of PM2.5 by 2014. The pilot program may begin reductions in the 2008 to 2010 timeframe.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

As described in the Proposed Method of Control Section, the refineries could implement control at sources within and adjacent to refinery properties. For purposes of this control strategy, a cost effectiveness of $12,000 per ton of VOC and PM2.5 reduced was calculated based on reductions from (1) retrofit of marine engines for ocean going vessels (2) replacement or retrofit of 2-stroke pleasure craft engines, and (3) installation of diesel particulate filters on heavy-heavy-duty trucks.

Since this measure is voluntary, implementation of this control measure is expected to reduce the overall cost of compliance with District rules and regulations. Implementation of this control measure is expected to provide sources with more cost-effective compliance methods. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to regulate fugitive VOC and PM2.5 emissions sources. The pilot program is subject to CARB and EPA's approval as part of the SIP that defines the SCAB's attainment strategy to meet the federal ozone and PM2.5 standards.

REFERENCES

2003 AQMP, Chapter 4 AQMP Control Strategy, pp. 4-46 to 4-47 "Add Flexibility to Current Programs".

GROUP 7

Emission Growth Management

EMISSION REDUCTIONS FROM NEW OR REDEVELOPMENT PROJECTS [NO_X, VOC, AND PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	NEW OR REDEVELOPMENT PROJECTS		
CONTROL METHODS:	ENHANCED CEQA AIR QUALITY REVIEW AND MITIGATION THROUGH DISTRICT REGULATION		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NO_X INVENTORY	N/A	13.4	12.0
NO_X REDUCTION		0.0	0.8
NO_X REMAINING		13.4	11.2
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NO_X INVENTORY	N/A	13.3	11.9
NO_X REDUCTION		0.0	0.8
NO_X REMAINING		13.3	11.1
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	N/A	27.5	39.8
VOC REDUCTION		0.0	0.5
VOC REMAINING		27.5	39.3
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	N/A	32.4	47.0
VOC REDUCTION		0.0	0.6
VOC REMAINING		32.4	46.4
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	N/A	5.7	8.8
PM2.5 REDUCTION		0.0	0.5
PM2.5 REMAINING		5.7	8.3
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	DISTRICT/LOCAL OR REGIONAL AGENCIES		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to mitigate emission growth from new development and redevelopment projects. This initiative is designed to reduce emissions related to new residential, commercial, industrial and institutional development, including redevelopment, required to meet the needs of the Basin's future residents and economy. Lead agencies for projects subject to California Environmental Quality Act (CEQA) currently prepare air quality analysis as part of their environmental documents, including emissions during construction and operations. Typical emissions during construction phase include, but are not limited to: fugitive dust emissions, combustion emissions from off-road mobile sources (construction equipment) and on-road mobile sources, and coating and asphalt evaporative emissions. Operational emissions include, but are not limited to: area sources (e.g., water heater emissions), on-road mobile source emissions (worker commute trips, delivery truck trips, etc.), consumer products and other emissions sources depending on the specific type of land use. The purpose of this proposed measure is two-fold: (1) compliance with the "all feasible measures" requirement of the state law, and (2) capturing emission reduction opportunities during project development phase. In regards to "all feasible measures", the California Clean Air Act requires districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures (Health and Safety Codes 40913, 40914 40920.5). The term "feasible" is defined in the 14 California Code of Regulations, section 15364, as a measure "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

Background

New development projects produce new sources of air pollution from new vehicle trips, use of consumer products, landscape maintenance, new stationary source processes such as fuel combustion, as well as emissions generated during construction activities. Each day millions of vehicles travel the roads in the South Coast Air Basin and the length of vehicle trips is expected to increase as outlying areas continue to be developed. In addition, older residential, commercial and industrial areas may undergo major redevelopment involving construction activities, with emissions comparable to new development projects. Redevelopment projects may also generate additional vehicular traffic compared to the projects they replace because redevelopment projects often involve increasing population density compared to the previous use. Redevelopment includes demolishing existing buildings, increasing overall floor area or building additional capacity on an existing property. For example, the conversion of an industrial warehouse to an office building could create as much emissions as constructing a new building because it would be a complete remodel.

Regulatory History

California Health and Safety Code Section 40716 states that "a district may adopt and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution". Furthermore, a 1993 California Attorney General opinion states that "a district's regulations may require the developer of an indirect source to submit the plans to the district for

review and comment prior to the issuance of a permit for construction by a city or county. A district may also require the owner of an indirect source to adopt reasonable post-construction measures to mitigate particular indirect effects of the facility's operation. Such regulations could be enforced through an action for civil penalties…" H & S Code 40716 also states that the authority of a district to reduce or mitigate emissions from indirect and areawide sources of air pollution does not constitute an infringement on the existing authority of counties and cities to plan or control land use.

Health and Safety Code 42311(g) allows districts to adopt a schedule of fees on areawide or indirect sources which are regulated, but for which permits are not issued, to cover the costs of District programs related to this source.

San Joaquin Valley Unified Air Pollution Control District's (SJVUAPCD) Rule 9510 – Indirect Source Review, adopted on December 15, 2005, requires new development projects to submit an Air Impact Assessment application to the District prior to obtaining discretionary approval for a building permit. Developers are required to implement mitigation measures to reduce PM10 and NOx emissions or, as an alternative, may pay into a mitigation fund for SJVUAPCD sponsored emission reducing off-site projects. The rule applies to certain specified industrial, commercial, and residential projects based upon the amount of build-out upon project completion. Specifically, the rule applies to projects which include any of the following: 50 residential units; 2,000 square feet (sq. ft.) of commercial space; 25,000 sq. ft. of light industrial space; 100,000 sq. ft. of heavy industrial space; 20,000 sq. ft. of medical office space; 39,000 sq. ft. of general office space; 9,000 sq. ft. of educational space; 10,000 sq. ft. of government space; 20,000 sq. ft. of recreational space; and 9,000 sq. ft. of space not identified. It also includes transportation projects whose construction exhaust emissions will result in a total of two tons per year of NOx or PM10. The rule is designed to reduce the impact of development projects to the extent needed to allow SJVUAPCD to reach attainment of ozone and PM10 standards.

Many California air districts have adopted and implemented indirect source rules, policies, and/or the collection of mitigation fees. Examples of other air district's rules or policies are briefly summarized below:

Mendocino County Air Quality Management District (MCAQMD) requires an Authority to Construct prior to starting construction, modification, operation or use of any stationary, portable, or indirect source. It further defines in Rule 1-130 an indirect source as "a facility, building, structure or installation, or combination thereof, that indirectly results in, or is projected to result in unmitigated emissions in excess of the following: ROG – 180 lbs/day, NOx – 42 lbs/day, CO – 690 lbs/day, PM10 – 80 lbs/day." Furthermore, projects with an annual combined stationary source release of 25 tons or more of any air contaminant are subject to emissions assessment fees.

Great Basin Unified Air Pollution Control District's (APCD) New Source Review Requirements For Determining Impact On Air Quality Secondary Sources define indirect sources as a secondary source, which is any structure, building, facility, equipment, installation, operation, or aggregation thereof. General provisions include, "A person shall not initiate, modify, construct or operate any secondary source which will cause the emission of any manmade air pollutant for which there is a state or national ambient air quality standard without first obtaining a permit from the Air Pollution Control Officer." The District, through Rule 301, imposes fees on secondary sources. The fees are based on the size of the commercial unit and the number of parking spaces, or the number of residential dwelling units.

Colusa County APCD Rule 4.8 – Indirect Source Review Fee: defines indirect source as any facility, building, structure, installation, real property, road or highway which may cause mobile source emissions. The fee is based on commercial or industrial square footage or by the number of residential units.

Placer County APCD Policy Regarding Land Use Air Quality Mitigation Funds assesses emissions estimated to occur during the ozone season of May-October from a particular project; and if sufficient permanent on-site mitigation measures cannot be implemented to adequately reduce emissions, the APCD will apply a cost effectiveness factor to calculate funds required to attain offsite emission reductions.

Shasta County AQMD Rule 3:16 – Fugitive, Indirect, Or Non-Traditional Sources authorizes the AQMD to place conditions upon indirect sources to mitigate emissions to a level which will not constitute a violation of Health and Safety Code Sections 41700 and /or 41701. Resolution No. 84-2, Resolution Of The Shasta County Air Pollution Control Board Amending The Rules Of The Shasta County Air Pollution Control District, authorizes an in-lieu buy out schedule for road paving, per parcel below 1,000 feet in elevation.

Proposed Method of Control

The District is obligated by law to consider all feasible control measures which would include a measure that is considered at least equivalent to the programs implemented by other air districts. District staff convened a working group made up of stakeholders from industry, local governments, and community representatives to explore approaches to reduce emissions from indirect sources.

As part of the program development process, consideration will also be given so that the program requirements would not interfere with potential third party funding opportunities. Three working group meetings were held and, based on the input received, the proposed control measure would require the District to develop a rule to establish applicability criteria for emissions or other equivalent parameters for new development and redevelopment projects. All discretionary permit applications filed with local jurisdictions pursuant to CEQA would be required to submit an Air Quality Analysis application per District methodology along with their CEQA documents prior to issuance of a building permit if the projects meet the applicability criteria. Projects meeting the established criteria would also be required to reduce their emissions by selecting a series of mitigation measures from a menu of options provided in

the rule. However, consideration will be given to any additional equivalent mitigation measures submitted by the project proponent. Mitigation measure requirements will be technically feasible and cost effective. Compliance with the rule will be achievable through the selection and implementation of mitigation measures chosen from a menu of options and without unduly restricting local or regional jurisdictions' prerogatives respecting land use approvals. During rule development, special consideration will be given to the need to assure that any rule adopted will integrate with and enhance the CEQA process nor retard project approvals in light of CEQA timelines. The District will conduct outreach and field audits to ensure rule compliance.

During the rule development process, a number of issues will be examined further, such as but not limited to:

- Rule applicability
- Menu of mitigation options
- Projects within SCAG's 2% Compass Plan
- Regional Transportation Plan Projects
- Incentives for developers to incorporate air quality mitigation measures beyond rule requirements into their projects, such as District recognition of exemplary projects
- Timely review of project application

As part of the District's streamlining of the process, the rule will include a local delegation component in which a local or regional jurisdiction may elect to implement a program comparable to the District's for reviewing applications or by adopting an ordinance equal to or more stringent than the rule. Coachella Valley Association of Government's PM10 mitigation measures in Rule 403 – Fugitive Dust are good examples of how local ordinances can be incorporated in a District rule. This delegation will include technical training and field auditing to be conducted by the District.

District staff will continue the EGM-01 working group for rule development, including stakeholders from local governments, building industry, developers, realtors, other business representatives, environmental/community members and other stakeholder representatives to carry out this initiative, resolve issues, prepare guidance, and identify solutions to implementation barriers. Written comments from stakeholders and the working group on the proposed control measure will be taken into consideration during the rulemaking process. The District will follow a two step public hearing procedure which will provide a pre-hearing to receive public comments on the basic program design prior to the adoption hearing before the District Governing Board.

EMISSIONS REDUCTION

The precise emissions inventory for future new or development projects within the Basin cannot be determined at this time. For the purpose of illustrating the potential inventory, Table 2 shows the emission sources that could be affected by this measure. These emissions would be further refined during rulemaking. Based on the emission growth projected for this region, a reduction target of 1.0 tpd of NOx, 0.5 tpd of VOC, and 0.5 tpd of PM2.5 is established for 2020. Due to continued fleet turnover, by 2023 the emission reduction targets for NOx will be

0.8 tpd, while the VOC and PM2.5 targets will remain at 0.5 tpd. Although the commitment appears small, this target takes into account emission reductions credited to other AQMP control measures. The reduction estimates will be re-evaluated during the rule development process. Any emission reductions achieved beyond the SIP commitment stated here will contribute to the "black-box" reduction commitment. Table 2 shows the emissions from growth in 2014 and 2023 that may be targeted.

TABLE 2

Projected Emission Inventory from New & Redevelopment Projects [(1) (2)]
(tons/day)

	2014				2023		
	VOC	NOx	PM2.5		VOC	NOx	PM2.5
Manufacturing & Industrial *(fuel combustion)*	0.14	0.29	0.13		0.16	0.39	0.14
Service & Commercial *(fuel combustion)*	0.08	0.24	0.04		0.11	0.09	0.01
Residential* *(fuel combustion)*	0.38	1.34	0.77		0.61	1.91	1.39
Asphalt Paving* *(solvent evap.)*	0.29	nil	nil		0.47	nil	0.01
Consumer Products* *(solvent evap.)*	11.33	nil	nil		17.41	nil	nil
Architectural Coatings* *(solvent evap)*	2.97	nil	nil		5.33	nil	nil
Cooking*	0.30	nil	2.15		0.49	nil	3.47
Lawn & Garden Equipment*	4.79	0.97	0.10		7.73	1.27	0.13
Construction Equipment*	0.59	2.71	0.55		0.51	2.31	0.07
Construction & Demolition	nil	nil	0.94		nil	nil	1.50
Paved Road Dust	nil	nil	0.58		nil	nil	0.98
Light Duty Auto *(on-road motor)*	1.31	0.91	0.13		1.28	0.48	0.23
Light Duty and Light Heavy Duty Trucks *(on-road motor)*	3.19	4.09	0.13		3.73	3.72	0.59
Medium Duty & Medium Heavy Duty Trucks *(on-road motor)*	1.84	2.21	0.19		1.81	1.48	0.30
Heavy Heavy Duty Trucks *(on-road motor)*	0.25	0.63	nil		0.15	0.38	0.01
TOTAL	**27.46**	**13.39**	**5.71**		**39.79**	**12.03**	**8.83**

(1) Emission inventory incorporates proposed short-term measures in the 2007 plan to avoid double counting.
(2) Assumes 50% of emission growth attributable to new and redevelopment projects except categories noted with an asterisk (*), where 100% is assumed.

RULE COMPLIANCE

The District will adopt a rule to implement this measure and Rule compliance will be verified via field inspection.

TEST METHODS

Approved emission quantification protocols by federal, state or local agencies will be used to track and report emission reductions for SIP purposes.

COST EFFECTIVENESS

Cost-effectiveness will be developed during the rulemaking process based on the mitigation measures included in the menu of options.

IMPLEMENTING AGENCY

The District has the authority to implement this measure under its indirect source authority in conjunction with local lead agencies.

EMISSION BUDGET AND MITIGATION FOR GENERAL CONFORMITY PROJECTS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ALL SOURCES CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

A General Conformity determination is required by the federal Clean Air Act (CAA) for federal actions. These actions include airport expansion like those proposed for LAX and major projects that receive federal funding. In addition, approval of federally funded transportation plans, programs, and projects are covered by the Transportation Conformity requirements of the Clean Air Act.)

The requirements for General Conformity are contained in section 176(c)(1) of the CAA and in the General Conformity regulations promulgated by EPA in 1993 (40 CFR Part 51, Subpart W, and 40 CFR Part 93). In general, federal actions must support the goals of the State Implementation Plan (SIP) and be shown to not:

* Cause or contribute to new violations of any standard;
* Increase the frequency or severity of any existing violations;
* Interfere with the timely attainment or maintenance of any standard
* Delay emission reduction milestones; or
* Contradict SIP requirements.

The General Conformity regulations apply to nonattainment areas where the estimated emissions from the action meet or exceed specified emission rates for each NAAQ.

One of the criteria for determining conformity for ozone nonattainment areas (40 CFR Part 51.858) is for the District to make a determination that the total of the direct and indirect emissions from the General Conformity project does not exceed the emission budget in the SIP.

In each of the past several years, the District has been asked to review one to several projects relative to General Conformity. These are generally very large projects and it is not always possible for the emissions to be offset. In this case, District staff must make a General Conformity determination that involves examining each emission category for each of the pollutants that are above the specific applicable thresholds in the General Conformity regulations. This control measure will reduce the potential uncertainty in determining whether emissions from specific projects are definitively included in projected growth for future years, by establishing a specific budget for projects not specifically included in the Plan and emission budgets, and setting up a Mitigation Fee Program for situations that exceed these budgets.

PROPOSED METHOD OF CONTROL

In order to provide clear General Conformity budgets in the SIP, the District proposes the following approach:

- Establish a percentage of remaining emissions from each source category in the 2007 AQMP for each milestone year will be set aside as emission budgets for projects subject to general conformity, unless certain emissions are explicitly identified in the plan for such purpose;
- Emission budgets are on a first-come-first-serve basis and the District will track all consumption as part of its NEPA review process;
- If project emissions exceeded the budgets for the source category, the portion of emissions exceeding the budgets needs to be fully offset/mitigated;
- If the mitigation measures are not sufficient to offset the emissions, the District Board may make a finding of overall air quality benefit and allow mitigation fees in lieu of reductions;
- The District will use the fees to invest in emission reduction projects within the affected community, to the extent feasible;
- Surplus reductions to the SIP commitments due to CARB or District regulatory actions can be used as additional budgets for the duration such reductions remain surplus.

Mitigation Fee Program

The concept of the mitigation fee program proposed in this measure is to allow sources to pay a specified dollar per pollutant fee to mitigate residual emissions after all reasonably available mitigation measures are implemented. The District will establish fees per unit of pollutant equivalent to costs of potential emission reduction projects necessary to offset the emission impact. Appropriate protocols will be established to quantify and verify emission reductions.

EMISSIONS REDUCTION

Emission reductions would be sought in order to mitigate emission increases from general conformity projects that have exceeded the budgets for the source category. Surplus emission reductions achieved, if any, will be incorporated into the SIP inventories through Plan revisions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the mitigation measures would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source-specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectives for this measure cannot be determined because the mitigation measures and the emission reductions resulting from mitigation fees are not known at this time. However, for both situations the most cost-effective control strategy would be sought. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to establish an emission budget, assess mitigation measures, and seek emission reductions through the use of mitigation fees.

REFERENCES

40 CFR Part 51.858.

EMISSIONS MITIGATION AT FEDERALLY PERMITTED PROJECTS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ALL SOURCES CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

This control measure addresses mitigation measures for Federally permitted projects impacting the District. This need for mitigation was the result of a recently proposed project.

For example, a liquefied natural gas facility has been proposed in federal waters offshore of Ventura County. The project is subject to the Deepwater Port Act, and must obtain an air permit from the EPA. While the offshore activity is within Ventura County, the Basin is downwind and will be directly impacted by the proposed project. Although the onshore pipeline to be constructed within the jurisdiction of the District is addressed through CEQA, there is a concern about the quality of natural gas as this could significantly affect the District's progress towards achieving air quality goals in the air Basin (See Control Measure CMB-04).

Regulatory History

See Control Measure 2007 AQMP CMB-04 Natural Gas Fuel Specifications

PROPOSED METHOD OF CONTROL

The proposed method of control would depend upon the emissions generated from the Federally permitted projects. However, it is expected that the control method would rely upon commercially available technologies.

Possible mitigation scenarios include:

- Call for EPA to adopt measures to mitigate stationary source emission increases in SCAB due to its permitting actions
- If EPA cannot mitigate emission increases through its regulatory actions provide mitigation fees to the District as described in Control Measure EGM-02

- If EPA is not willing to do either of these abovementioned approaches, the basin sources would need to offset such increases.

EMISSIONS REDUCTION

Mitigation measures would be sought in order to reduce emissions generated from federally permitted projects.

RULE COMPLIANCE AND TEST METHODS

Compliance with the mitigation measures would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectives for this measure cannot be determined because the mitigation measures are not known. However, the most cost-effective control strategy would be sought. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available. For information purposes, the current Carl Moyer uses a cost effective criteria of $14,300 per (NOx + NOG + 20 x PM) and the program has been over-subscribed.

IMPLEMENTING AGENCY

The District has authority to require mitigation measures; however, additional legal authority may be needed.

REFERENCES

40 CFR Part 51.858.

GROUP 8

District's Mobile Source Control Measures

MITIGATION FEE PROGRAM FOR FEDERAL SOURCES [NO_X]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	FEDERAL SOURCES (AIRCRAFT, SHIPS, TRAINS, OTHER PREEMPTED SOURCES)
CONTROL METHODS:	MITIGATION FEE PROGRAM
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD, U.S. EPA; POSSIBLY REQUIRING ADDITIONAL LEGISLATION

DESCRIPTION OF SOURCE CATEGORY

Background

The primary authority for establishing emission standards for ships, aircraft, trains, and new off-road farm and construction equipment less than 175 horsepower (HP) is under federal jurisdiction. The District may adopt use or operational limitations for such sources. Emissions from these federal sources continue to represent a significant and increasing portion of the emissions inventory in the South Coast Air Basin. Current emission estimates for aircraft, marine vessels, and locomotives indicate that activity and emissions from these sources will substantially increase in future years. Without adequate controls of these sources, however, the emissions reduction burden would have to be unfairly shifted to other stationary and mobile sources that have been regulated for many years, seriously jeopardizing the attainment of the 8-hour ozone and PM2.5 standards may not be possible.

Regulatory History

Locomotive, Aircraft, and Ships

In 1998, U.S. EPA adopted regulations affecting all new or remanufactured locomotives after January 1, 2000. Specific emission standards found in 40CFR Part 92 depend on the date of manufacturer or remanufacture and the type of duty-cycle, but may go as low as 5.5 g/bhp-hr NOx (Tier 2) and 0.2 g/bhp-hr PM (Tier 2) for line-haul locomotives manufactured on or after January 1, 2005. U.S, EPA is scheduled to propose new locomotive engine standards (Tier 3) by the end of 2006, for adoption sometime in 2007.

In addition, Measure M14 – National Emission Standards for Locomotives in the 1997 AQMP required low-emission locomotives to completely replace existing locomotives in the Basin by 2010. Control Measure #97M14 applied to all types of locomotives and assumed that U.S. EPA would develop a two-tiered national NOx emission standard. In adopting measure M14, ARB assumed that by 2010, locomotive fleets in the Basin will be required to emit a fleet-wide average of no more than the U.S. EPA's established Tier 2 emission level. To this end, ARB staff developed a Memorandum of Mutual Understandings and Agreements (Memorandum) with the California Railroads and the U.S. EPA that was signed in July 1998. The

Memorandum includes provisions for early introduction of clean locomotives in the Basin, which will meet the fleet-wide average target by 2010. In addition to the 1998 Railroad MOU, the state entered into an agreement in 2005 with the two Class 1 Railroads operating in California to monitor and reduce their air pollution associated health risks at 17 rail yards in the state.

As part of its attainment strategy, the District has adopted three rules applicable to railroads, which will reduce certain pollutants and toxic effects of diesel PM. The International Maritime Organization (IMO) established NOx standards in 1997 that apply to marine vessel engines over 130 kW installed on new vessels. IMO standards became effective in 2005 and applied to new ships manufactured on and after 2000. U.S. EPA adopted emission standards for commercial marine vessels in 1999 (40CFR Part 94). These standards primarily apply to commercial harbor craft since the large engines (i.e., 30 liters per cylinder) used by ocean-going ships are not covered by Part 94. However, the net emission benefit associated with the IMO requirements and EPA regulations are minimal because of their lack of stringency and the slow turnover rate of engines.

Aircraft emissions are regulated by the International Civil Aviation Organization (ICAO) and U.S. EPA. Current standards (HC, NOx, smoke) are based on engine thrust and vary depending on the engine pressure ratio. These standards are not expected to achieve any significant reductions in future years because of their lack of stringency. Currently, military aircraft are exempt from these engine standards.

California SIP

The existing regulations on federal sources are not expected to result in significant emission reductions in future years. For the PM2.5 and 8-hour ozone attainment, additional reductions would be necessary from federally regulated sources. Without an assurance that U.S. EPA will identify and commit to additional regulations and considering the attainment deadlines of 2015 for PM2.5 and 2021 for ozone, the District is proposing this Control Measure to ensure federal sources contribute their fair share to achieving federal ambient air quality standards.

The District is currently seeking to obtain broader legal authority to regulate mobile sources to the extent feasible (e.g., retrofit controls, mitigation fees).

PROPOSED METHOD OF CONTROL

As an alternative to stringent national rules and to achieve a fair share reduction commitment by federal sources to address unique local needs, this control measure proposes a mitigation fee program for federal sources. The program is to be adopted by U.S. EPA and the mitigation fee to be paid by federal sources through EPA rulemaking and/or U.S. EPA grants to the District. The District will use the funds collected to solicit proposals from both federal and non-federal sources to achieve equivalent reductions for SIP purposes. Under this control measure, U.S. EPA would be responsible for reducing NOx emissions from federal sources based on their emission contribution and the overall level of reductions needed for attainment. The estimated mitigation fee is assumed to be comparable to cost of mobile source NOx control technologies.

The program would be similar to the District's Emission Mitigation Fee Program for Power Producing Facilities (Regulation XX - RECLAIM) initiated in 2002 and to the Carl Moyer Memorial Air Quality Standards Attainment Program. The RECLAIM Emission Mitigation Fee Program was a program where power producing facilities that exceed annual allocations and met specified applicability requirements in Rule 2004 pay a participation fee to the District for generation of NOx emission reductions by the District to mitigate emission exceedances. The statewide Carl Moyer Memorial Air Quality Standards Attainment Program provides grants to offset the incremental cost of projects that reduce emissions of NOx from covered sources in California.

The District could also seek additional legislative authority to impose mitigation fees on such sources. Emission fee rates imposed on federal sources will be established based on specific criteria, including but limited to: type of federal source, emissions inventory, potential reduction opportunities, control cost, and proximity to Environmental Justice (EJ) areas. In addition, a source specific metric for determining a common unit of activity measurements could be used as a basis for establishing the fee rate. In order to ensure that the fee rate is properly adjusted from year to year, a monitoring and reporting procedure would be implemented to indicate any changes in the activity measurements or emission rates that would affect the fee charged to federal sources. Collected fees would be transferred to a special account established for the purposes of funding emission-reduction projects so that program performance can be monitored.

Selection of particular projects to be funded by the Mitigation Fee Program for federal sources would have to adhere to an implementation protocol approved by the Governing Board. This protocol will be developed through selective participation and will include specific selection criteria, including but not limited to: quantifiable emission benefits, emission reduction potential, cost-effectiveness, and proximity to affected areas (e.g., EJ areas). Projects to be funded would have to be approved by the District's Governing Board.

It is also envisioned that this mitigation fee approach would also apply to regional projects that require federal approval (e.g., new port terminals, airport expansion). As part of the development of this control measure, the District will evaluate the possibility of establishing a fee program for federally approvable projects where the emissions cannot be adequately mitigated. Fees would be levied on those excess emissions which could not be mitigated.

EMISSIONS REDUCTION

The 2023 baseline inventory for ships, aircraft, and trains is estimated to be approximately 173 tons of NOx per day which is approximately 65 percent of the off-road mobile source inventory and 36 percent of the total NOx inventory in the Basin. At this time, it is not possible to estimate any emission reductions from this control measure.

TEST METHODS

The appropriate test method(s) would depend on the specific NOx emission reduction projects undertaken.

COST EFFECTIVENESS

Not Determined.

IMPLEMENTING AGENCY

The District has the authority under the Lewis Presley Air Quality Management Act to collect fees based on emissions. However, implementation of this control measure may require additional legislation unless implemented by U.S. EPA. U.S. EPA would appropriate funding or enable collection of monies in lieu of control. The District would then fund cost-effective reduction projects with the collected funds.

EXTENDED EXCHANGE PROGRAM [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	SMALL OFF-ROAD ENGINES (SORE) AND RECREATIONAL OUTBOARD ENGINES
CONTROL METHODS:	EXCHANGE EXISTING IN-USE SORE FOR ELECTRICAL EQUIPMENT, OR NEW LOW-EMITTING ENGINES
EMISSIONS (TONS/DAY)	SEE EMISSIONS REDUCTION SECTION
CONTROL COST:	THE COST-EFFECTIVENESS OF THIS CONTROL MEASURE WILL VARY DEPENDING ON THE TYPE OF EQUIPMENT BUT HAS RANGED FROM $800/TON FOR LEAF BLOWERS TO $10,000 /TON FOR LAWN MOWER EQUIPMENT
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to promote accelerated turn-over of in-use small off-road engines (SORE) and other engines such as recreational outboard engines through expanded voluntary exchange programs.

Background

The small off-road engines (SORE) category consists of spark ignition engines run on gasoline or alternative fuel such as liquefied petroleum gas (LPG) or compressed natural gas (CNG), and are rated at below 25 horsepower (19 kW). The SORE equipment category includes handheld and non-handheld lawn and garden equipment such as string trimmers, leaf blowers, lawn mowers, generators, and lawn tractors, as well as other commercial/industrial equipment. This category does not include compression ignition engines or recreational vehicles. The vast majority of SORE equipment use gasoline.

Since 2003, the District has sponsored lawn mower buy back programs for residential users of old lawn mowers. This program has resulted in 11,500 high polluting gasoline-powered lawn mowers taken out of service in 2003-2005, and 4,000 lawn mowers being exchanged in 2006. The program is designed so that an individual turns in their old lawn mower in exchange for paying $100 towards a new electric-powered lawn mower. In addition to the lawn mower exchange program, the District has recently sponsored a gasoline-powered leaf blower exchange program targeted at commercial operators. In this program, an individual turns in their old gasoline-powered two-stroke leaf blower in exchange for paying $200 towards a new four-stroke gasoline-powered leaf blower certified to the CARB new engine emission standards. The new four-stroke units are less polluting than the two-stroke units. The leaf blower buy back program has resulted in 1,500 leaf blowers being exchanged.

Regulatory History

Since September 2003, CARB has established emission standards (exhaust and evaporative) for new SORE engines. However, CARB regulations do not impact existing equipment. As part of its commitment in the 2003 AQMP, in September 2003, the CARB Board also directed CARB staff to conduct research for potential increased use of electric equipment for small off-road engines. In April 2004, CARB staff reported to the Board that there is a high possibility of increasing the penetration for electric equipment through voluntary measures, incentive programs, and other consumer awareness programs.

PROPOSED METHOD OF CONTROL

In order to increase the penetration of electric equipment or new low emission gasoline-powered equipment, the District is proposing to expand its existing lawn mower/leaf blower exchange program. This expansion will be accomplished by increasing the number of exchange events and available funding for these programs. In addition, other SORE equipment as well as recreational outboard engines used in pleasure craft may also be considered for exchange programs for accelerating the turnover of existing engines. In addition to the voluntary program primarily envisioned by the control measure, the District will explore the potential of a mandatory turnover and replacement of older SORE.

EMISSIONS REDUCTION

This control measure promotes faster turnover rate of in-use engines to electric versions of the same equipment type or engines that meet the new low-emission standards. The expected emission reductions for this control measure would depend on the number and types of engines participating in the program. The expected annual emission reductions would be approximately 8 pounds VOC, 0.05 pounds NOx, and 26 pounds CO for each lawn mower replaced with an electric version; and 19 pounds VOC for each leaf blower replaced with a low-emission gas blower. The estimates for other type of equipment targeted in an exchange program would vary and are not estimated for this control measure.

RULE COMPLIANCE AND TEST METHODS

Due to its voluntary nature, compliance with the provisions of this control measure is not established. However, the criteria used for participation in existing exchange programs would be carried over into an expanded program. The type of criteria used in the existing exchange programs includes proof of residence, actual equipment operation, and limiting exchanges to one per individual.

COST EFFECTIVENESS

The cost effectiveness will depend on the types of engines or equipment participating in the exchange program. In the District's leaf blower exchange program, low emission units were offered at a cost of $200 instead of a typical retail price of $460. The total cost of this program was $225,000 funded through the District's Air Quality Investment Program (AQIP). The cost effectiveness of this leaf blower exchange program is reported to be $800 per ton.

In the lawn mower exchange program, electric lawn mowers were offered at $100 instead of at a typical retail price of $285. The total cost of the exchange program for 4,000 lawn mowers in 2006 was $856,000 funded through the District's AQIP. The cost effectiveness of this lawn mower exchange program is estimated to be $9,840 per ton.

IMPLEMENTING AGENCY

The District has successfully implemented voluntary exchange programs for leaf blowers and lawn mowers since 2003. The extended exchange program is expected to be implemented by the District.

REFERENCES

CARB - The 2003 State and Federal Strategy for the California State Implementation Plan, September 24-25, 2003.

CARB - Staff Report, Potential Electrification Programs for Small Off-Road Engines, April 2, 2004.

CARB - California Code of Regulation, Title 13, Division 3, Chapter 15, Article 1 – Evaporative Emission Requirements for Off-Road Equipment, September 2003.

CARB - Staff Report – Initial statement of reasons for proposed rulemaking public hearing to consider the adoption of exhaust and evaporative emission control requirements for small off-road equipment and engines less than or equal to 19 kilowatts, August 8, 2003.

SCAQMD - Governing Board March 3, 2006 Meeting, Agenda #5, Execute Contracts for Rule 2202 AQIP and the 2006 Lawnmower Exchange Program.

BACKSTOP MEASURES FOR INDIRECT SOURCES OF EMISSIONS FROM PORTS AND PORT-RELATED FACILITIES [NOX, SOX, PM]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: PORTS AND PORT-RELATED SOURCES (e.g., MARINE VESSELS, LOCOMOTIVES, TRUCKS, CARGO HANDLING EQUIPMENT, HARBOR CRAFT AND STATIONARY EQUIPMENT)

CONTROL METHODS: PORT AND PORT FACILITY EMISSION CONTROL PLANS, CONTRACTUAL REQUIREMENTS, RULES, TARIFFS AND INCENTIVES/DISINCENTIVES TO IMPLEMENT MEASURES INCLUDING:

- AFTERTREATMENT FOR DIESEL EQUIPMENT
- NON-DIESEL FUELED EQUIPMENT USING LNG, CNG, FUEL CELLS, ETC.
- LOW SULFUR FUELS
- EMULSIFIED DIESEL FUEL WITH DIESEL OXIDATION CONTROLS
- ELECTRICITY-POWERED SYSTEMS INCLUDING SHORE POWER FOR MARINE VESSELS
- INTERNAL ENGINE MODIFICATIONS
- RETROFIT AND REPLACEMENT OF IN-USE EQUIPMENT
- ALTERNATIVE TECHNOLOGY STRATEGIES SUCH AS BATTERY DOMINANT HYBRID SYSTEM
- VESSEL SPEED REDUCTION

EMISSIONS (TONS/DAY): TO BE DETERMINED

ANNUAL AVERAGE	**2002**	**2014**	**2023**
NOX INVENTORY	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD
NOX REMAINING		TBD	TBD

SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NOX INVENTORY	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD
NOX REMAINING		TBD	TBD

ANNUAL AVERAGE	**2002**	**2014**	**2023**
SOX INVENTORY	TBD	TBD	TBD
SOX REDUCTION		TBD	TBD
SOX REMAINING		TBD	TBD

ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM INVENTORY	TBD	TBD	TBD
PM REDUCTION		TBD	TBD
PM REMAINING		TBD	TBD

CONTROL COST: TO BE DETERMINED

IMPLEMENTING AGENCY: AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

The ports of Los Angeles and Long Beach are the largest in the nation in terms of container throughput, and collectively are the single largest fixed sources of air pollution in Southern California. Emissions from port-related sources, such as marine vessels, locomotives, trucks, harbor craft and cargo handling equipment, adversely affect air quality in the local port area as well as regionally. Collectively, port-related sources create more than 100 tons per day of smog- and particulate-forming nitrogen oxides – more than the emissions from all 6 million cars in the region. Port sources also release approximately 25% of diesel particulate matter emitted in the SCAB, and marine vessels alone emit 44% of regional SOx — a precursor to particulates. Marine vessels are also virtually the only significant source category with emissions projected to increase in coming years. This is due to substantial increases in projected cargo throughput, and the relative laxity of current emissions standards for these sources. Without substantial control of emissions from port-related sources, it will not be possible for this region to attain federal ambient air quality standards for ozone or PM2.5. Port sources also contribute to cancer risks. The California Air Resources Board estimates that cancer risks caused by sources in the ports exceed 500 in 1 million for over 50,000 residents near the ports. Many more persons are affected at lower levels of risk.

In January 2006, the District Board approved the Chairman's Clean Port Initiative, including several action items to control criteria pollutant emissions and cancer risks from ports and port-related facilities. Recognizing the unique legal authorities and expertise of the ports relating to operations on lands they control, the chairman's initiative called for the ports to take sufficient and coordinated actions to control emissions. At the time the initiative was announced, the ports had never cooperated to establish a coordinated, comprehensive plan to control air pollution. The initiative also called for a summit meeting between the presidents of the harbor commissions and the District board chair, which occurred in March 2006. Following that meeting, the staffs of the two ports met, with participation by the District, CARB and EPA, and developed a draft San Pedro Bay Ports Clean Air Action Plan (CAAP). The plan proposes to utilize the authorities of the ports, including powers to establish lease conditions, port rules, tariffs and incentives, to implement emission control strategies. The CAAP was approved by the harbor commissions in November of 2006.

The Chairman's initiative also called for the District to develop and adopt "backstop" rules that would take effect if the ports did not take actions that, in conjunction with standards adopted by CARB, EPA, the District and the International Maritime Organization, would achieve sufficient, timely emission reductions. The goals of the backstop rules would be to (1) achieve reductions in emission from port-related sources to levels needed for attainment of ambient air quality standards, consistent with the AQMP, (2) reduce health risks from toxics to acceptable levels, and (3) prevent increases in health risks and criteria pollutant emissions from port projects

This AQMP measure is intended to achieve the goals described above. This measure is fashioned as a "backstop" so as to allow the ports discretion regarding the manner in which emissions and risks are controlled, and regarding the implementing tools that will be used (e.g. environmental lease conditions, port rules, tariffs or incentives), as long as performance goals

are met. A key element of this measure—the criteria pollutant emission reduction goals—is taken from the AQMP attainment analysis. Based on computer modeling and other analyses conducted for the AQMP, District staff has quantified the emission reductions needed from port-related sources to attain the federal 8-hour ozone and PM2.5 ambient air quality standards. These emission reduction amounts will be incorporated into District backstop rules implementing this measure, with a goal of assuring that such reductions timely occur. In addition, the district expects to seek SIP credit for such reductions.

Regulatory History

Emissions from sources associated with the ports—marine vessels, harbor craft, cargo handling equipment, locomotives, and trucks—have historically been regulated primarily by international, federal or state authorities. The International Maritime Organization (IMO), an agency of the United Nations, has established NOx emissions limitations and fuel sulfur specifications for oceangoing vessels; the federal Environmental Protection Agency (EPA) has adopted emission standards for new locomotives, new trucks and some vessels; and the California Air Resources Board (CARB) has adopted standards for new trucks and recently voted to adopt standards for cargo handling equipment and marine auxiliary engine fuels. Neither federal nor international law explicitly require EPA or IMO regulations to be sufficiently stringent to meet the needs of a particularly polluted region such as South Coast, and the rules adopted by those bodies have not met those needs.

Key regulatory and other actions taken to date are as follows:

- *International Maritime Organization Emissions and Fuel Standards.* IMO NOx standards for new "Category 3" vessels (including the container vessels responsible for the greatest share of emissions from local ports) will achieve only a six percent reduction in emissions. IMO fuel rules allow extraordinarily high levels of sulfur content, up to 45,000 parts per million, and actual sulfur content for main engine fuels averages approximately 27,000 ppm.

- *EPA Marine Vessel Regulations.* The vast majority of oceangoing vessels calling on local ports are foreign flagged. Their emissions have not been regulated by EPA. EPA stated several years ago that it would consider adopting emission standards for foreign flag vessels in 2007, but there is no guarantee that it will do so, or that such standards will be adequate for this region. EPA has stated that there is a question regarding its authority under the Clean Air Act to regulate foreign vessels.[7] EPA has recently announced it will delay these rules until December 2009.

- *EPA Emission Standards for Locomotives.* Under current EPA "Tier 2" regulations, the newest locomotives must achieve an approximate 57% reduction in NOx emissions. In 2004, EPA stated its intent to propose more stringent locomotive emission standards, but those regulations have been delayed and there is no assurance that such standards will be

[7] As stated by EPA, this is an issue of statutory authority under the Clean Air Act. 68 Fed.Reg. 9759 (February 28, 2003). This is not a question of authority of the United States to control emissions from foreign flag vessels. International law recognizes the authority of a nation to adopt environmental standards for vessels that enter the nation's ports. *United Nations Convention on the Law of the Sea,* Art. 21.1; Art. 25.2 and Art. 211.3.

sufficient for this region to achieve healthful levels of particulates, ozone or toxics. EPA recently proposed locomotive rules which will not achieve reductions in South Coast in time for PM2.5 attainment.

- *EPA and CARB Emission Standards For Trucks.* Adopted standards are stringent, but full benefits are many years away because the standards generally apply only to new units and trucks have long useful lives.

- *CARB Marine Auxiliary Engine and Cargo Handling Rules.* The majority of marine vessel emissions are created by main propulsion engines, but auxiliary engines emissions are important, in part because they occur at dock in closer proximity to persons in and around the port. In December 2005, the CARB Board voted to adopt fuel sulfur standards for marine auxiliary engines, including those on foreign flag vessels, in waters out to 24 nautical miles. The rule will limit fuel sulfur to 5,000 ppm, with the potential to require 1,000 ppm sulfur content by 2010 pending a technology and fuel availability review.[8] Industry has filed Suit arguing that CARB lacks the authority to adopt or enforce the rule against foreign flag vessels beyond three miles from the coast, and raising other legal issues. The CARB Board also voted in December to adopt emission standards for cargo handling equipment such as yard tractors.

- *MOUs.* In 1998, CARB entered into an MOU with the Union Pacific and Burlington Northern Santa Fe railroads which established a fleet average emissions limit for locomotives operating in the South Coast Air Basin. The intended effect of this MOU is to accelerate introduction of Tier 2 locomotives (achieving an approximate 57% level of NOx control) in this region. In June 2005, CARB entered into a second MOU with the same two railroads that is intended to reduce health risks near railyards and is projected by CARB to achieve a 20% reduction in PM emissions. Finally, several years ago, the ports, shipping interests, and regulatory agencies entered into a MOU seeking voluntary reductions in vessel speed to reduce NOx emissions.

- *SCAQMD Rules Governing Locomotive Idling and Risk Assessment.* In 2005 and 2006, the District adopted rules requiring railroads to minimize unnecessary locomotive idling, and to develop emissions inventories and health risk assessments and notify the public of health risks. These rules have been held invalid at the trial level. The District Board has voted to appeal that court decision.

- *Funding Programs.* SCAQMD, CARB and EPA have funded numerous projects to reduce emissions from port-related sources.

- *CARB Emission Reduction Plan for Ports and Goods Movement.* This plan, adopted in April, 2006, includes a wide ranging set of proposed control strategies, designed to achieve an 85% reduction in risk from diesel particulate matter compared to risks in 2000, and to achieve specified reductions in criteria pollutant emissions. The measures in the plan are described in conceptual terms, and implementing agencies generally are not identified. The

[8] The District believes that levels lower than 5,000ppm are feasible; the Danish shipping company Maersk recently announced that it is using fuel with sulfur content of no more than 2,000 ppm in main and auxiliary engines within 24 miles of the California coast.

plan recognizes that action by local bodies (such as the ports through their lease agreements) is one potential means to implement its measures. CARB staff has also stated its intent to develop proposed rules during 2007 that would, among other things, limit fuel sulfur content for vessel main engines and require shore power for ships at dock.

- *Port Actions.* Both the ports of Los Angeles and Long Beach have developed emission control programs and plans that will help mitigate air quality impacts. (*E.g.* Port of Long Beach *Green Port Policy*,[9] Port of Los Angeles *Clean Air Program*[10]). To date, however, port actions (along with the regulatory and other actions described above) have not arrested growth in port emissions. The *San Pedro Bay Ports Clean Air Action Plan* (CAAP) adopted in November, 2006, would substantially reduce emissions at a pace that, for some measures, is faster than proposed and adopted CARB measures. In addition, as noted earlier, the ports, as landlords to marine terminals and other facilities, have legal authority to require and incentivize controls in ways that regulatory agencies do not. There will not, however, be an enforceable obligation for the ports to implement the CAAP unless a mechanism such as the backstop rules envisioned by this measure is adopted.

PROPOSED METHOD OF CONTROL

The goal of this measure is to establish, and ensure achievement of, the following standards:

- *Port Standards.* Control emissions from port-related sources sufficiently to—
  - reduce year 2014 and 2023 emissions of NOx, SOx and PM to implement the AQMP strategy to attain federal PM2.5 and 8-hour ozone ambient air quality standards,
  - ensure interim progress by reducing year 2011 NOx, SOx and diesel PM emissions to 2001 levels,
  - by 2020, further control diesel PM sufficiently to reduce health risk from the ports by at least 85% compared to 2000 levels,
  - if necessary, continue progress to reduce cancer risk from diesel PM to a lower level to be determined through rulemaking.
- *Project Standards.* Assure that approvals of port projects will—
  - implement all measures needed to achieve the Port Standards, and
  - prevent significant increases in NOx, SOx, PM, and health risk from diesel PM.

This control measure will be implemented through District rules directed at the ports or operators of port facilities (e.g. marine terminals and railyards). These "backstop" rules will become effective if the ports or facilities do not take actions sufficient to achieve the port and project standards. More specific descriptions of the standards and backstop rules are set forth below:

[9] http://www.polb.com/environment/green_port_policy.asp
[10] http://www.portoflosangeles.org/environment_air.htm

1. Backstop of Port Standards for Nonattainment Pollutants

Summary: This rule will establish enforceable nonattainment pollutant emission reduction goals for the ports in order to implement the Air Quality Management Plan (AQMP). This "backstop" rule will come into effect if aggregate emissions from port sources exceed specified emissions targets. If emissions do not exceed such targets, the ports and source operators will have no control obligations under this rule.

Elements of Rule:

Emissions Targets: In developing the year 2007 revision to the AQMP, District staff has identified emission reductions from port-related sources that are necessary to timely attain federal PM2.5 and 8-hour ozone standards. In doing so, staff has considered analyses of needed regional emissions reductions, control factors and schedules in CARB's *Emission Reduction Plan for Ports and Goods Movement,* the draft *San Pedro Bay Ports Clean Air Action Plan,* and other information. Based on such information, staff has calculated mass emissions targets for NOx, SOx, and diesel PM for the ports. The emissions targets are for the years 2014 and 2020—the years in which attainment must be demonstrated for the PM2.5 and "8-hour" ozone National Ambient Air Quality Standards. As part of this rulemaking, staff will also calculate triennial mass emission milestones for years beginning in 2008 that are reasonable to achieve the emissions targets. In order to assure early progress, and consistent with goals stated in CARB's *Emission Reduction Plan for Ports and Goods Movement*, the milestones for the year 2011 will be below emissions in the year 2001.

Scope of Emission Included. Emissions from all sources associated with each port, including equipment on port property, marine vessels traveling to and from the port while in California Coastal Waters, locomotives and trucks traveling to and from port-owned property while within the South Coast Air Basin.

Trigger Causing Backstop Rule Regulatory Requirements to Come Into Effect. Emissions exceeding a target or triennial milestone, as determined by the District Executive Officer in consideration of annual port emission inventories and any other relevant data.

Requirements if Backstop Triggered. Two options for structuring this backstop rule will be considered during rulemaking. The first focuses obligations on operators of terminals and other facilities at the ports; the second focuses obligations on the ports themselves.

Option 1: Facility Plans. If this backstop rule is triggered for a port, emission reduction requirements will be established for each facility at the port that will, in aggregate, be sufficient to bring the port into compliance with the target or milestone within a timeframe specified in the rule. The emission reduction requirements will be allocated among port facilities by the port (with District approval), or the port may refer the issue to the District Executive Officer to decide based on activity level and level of control at each facility. Each facility operator will then be required by the backstop rule to submit to the District a plan including measures sufficient to timely achieve the required emission reductions. The operator may choose what measures to

include and what sources to control, but the measures must provide assurance that the required emissions reductions will be achieved. During rulemaking, other options to achieve emission reductions will be evaluated such as, but not limited to a mitigation fee program, accelerated emission reductions, etc. Failure to implement the approved plan would be a violation of this rule by the facility operator.

Option 2: Port Plan. If this backstop rule is triggered for a port, that port shall submit an Emission Control Plan to the District. The plan shall include measures sufficient to bring the port back into compliance with the emissions target or milestone within a timeframe specified in the rule. Failure to implement the plan would be a violation of this rule by the port.

2. Backstop of Port Standards for Health Risk

Summary. This rule will establish enforceable requirements to control diesel particulate matter sufficiently to reduce health risks by at least 85% by 2020, and to further reduce emissions if necessary to achieve acceptable levels of health risk. This "backstop" rule will come into effect if a port does not adopt and implement a plan sufficient to reduce port risks, or if risks exceed milestones.

Elements of Rule

Risk Reduction Milestones. In developing this rule, the District will establish triennial risk reduction milestones for the ports necessary to assure that, by the year 2020, health risks from diesel particulate matter will be reduced by 85% compared to risks in 2000. The scope of the health risk and health risk milestones including the sources, TACS, etc will be discussed during rulemaking. Risk reduction milestones will be stated in a form determined during rulemaking, and may be a percentage risk reduction, a risk level, an amount of diesel PM emission reduction, or other form. Depending on the form of the risk reduction milestones, the ports will be required to submit triennial reports to verify progress. During rulemaking, the District will also consider what, if any, additional emissions reductions will be necessary to achieve acceptable levels of health risk.

Trigger Causing Backstop Rule Regulatory Requirements to Come Into Effect. Failure of a port to implement a plan of measures that provide assurance of achieving the 85% standard, or emissions exceeding a triennial milestone as determined by the District Executive Officer in consideration of periodic port emission inventories and any other relevant data.

Requirements if Backstop Triggered. This rule will be implemented in a fashion similar to one of the two options stated above under *Backstop of Port Standards for Nonattainment Pollutants,* except that emissions or risk control requirements would be established based on the risk reduction goals of this rule. During rulemaking, other options to achieve emission reductions will be evaluated such as, but not limited to a mitigation fee program, accelerated emission reductions, etc.

3. Backstop of Port Project Standards

Summary. This rule will establish requirements for new port projects in order to (1) prevent significant increases in NOx, SOx and PM, and health risk from diesel PM, and (2) ensure that port projects implement all control measures needed to achieve the Port Standards described elsewhere in this measure. This "backstop" rule will come into effect if a port approves a project that does not assure that the project standards in this measure will be met.

Elements of Rule

Applicability. This rule will apply to projects on port land for which a CEQA document such as an Environmental Impact Report, Environmental Impact Statement or mitigated negative declaration is prepared and/or terminal and railyard capacity expansions, lease approvals and lease modifications.

Project Standards. The following standards will be proposed for adoption:

1. Risk Limits. Incremental health risks caused by emissions from facilities affected by a project may not exceed pre-project risks by more than the following:

- Maximum Individual Cancer Risk: 10 in a million.
- Noncancer Acute and Chronic Hazard Index: 1.0

2. Nonattainment Pollutant Limits. Emissions from a port facility affected by a project may not exceed pre-project emissions by amounts that exceed a specified level such as the District's CEQA significance thresholds unless—

- maximum available controls are employed by sources that operate at, or to and from, the facility, and
- feasible mitigations are provided for any emissions increases.

During rulemaking, the district will also consider whether or not to require that emissions increases be offset.

Contribution to Emissions and Risk Reductions. The project approval must contain terms providing reasonable assurance that projected emissions from the new or modified facility will, in conjunction with projected emissions from the rest of the port, allow the port to achieve the emissions targets and milestones established as Port Standards under this measure.

Trigger Causing Backstop Rule to Come Into Effect. Port approval of a project that does not comply with the standards in this rule, as determined by the District Executive Officer.

Requirements if Backstop Triggered. If triggered, the backstop rule comes into effect for the project that triggered it. Such project may not commence construction unless the Executive Officer determines that the project will comply with the requirements of this rule.

RULE COMPLIANCE

Compliance with this control measure will depend on the type of control strategy implemented through each proposed rule. Compliance will be required through compliance plans, and enforced through inspections by District inspectors.

TEST METHODS

The appropriate test methods will depend on the specific emission reduction projects undertaken and will be specified in each proposed rule. In general, the District, CARB and EPA test methods will be used, as well as manufacturer's data.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. The District will analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to adopt regulations to reduce or mitigate emissions from indirect sources, i.e. facilities such as ports that attract on and off-road mobile sources, and has certain authorities to control emissions from off-road mobile sources themselves. These authorities (which are further discussed in Addendum A of the Board Letter for Agenda Item 24, January 6, 2006 District Board meeting) include the following:

Indirect Source Controls. State law provides the District authority to adopt rules to control emissions from "indirect sources." The Clean Air Act defines an indirect source as a "facility, building, structure, installation, real property, road or highway which attracts, or may attract, mobile sources of pollution." 42 U.S.C. § 7410(a)(5)(C); CAA § 110(a)(5)(C). Districts are authorized to adopt rules to "reduce or mitigate emissions from indirect sources" of pollution. (Health & Saf. Code § 40716(a)(1)). The South Coast District is also required to adopt indirect source rules for areas where there are "high-level, localized concentrations of pollutants or with respect to any new source that will have a significant impact on air quality in the South Coast Air Basin." (Health & Saf. Code § 40440(b)(3)).

Nonvehicular (Off-Road) Source Emissions Standards. Under California law "local and regional authorities," including the ports and the District, have primary responsibility for the control of air pollution from all sources other than motor vehicles. (Health & Saf. Code § 40000). Such "nonvehicular" sources include marine vessels, locomotives and other non-road equipment. CARB has concurrent authority under state law to regulate these sources. The federal Clean Air Act preempts states and local governments from adopting emission standards and other requirements for new locomotives (Clean Air Act § 209(e); 42 U.S.C.§ 7543(e)), but California may establish and enforce standards for other nonroad sources upon receiving authorization from EPA (*Id.*). No such federal authorization is required for state or local fuel, operational, or mass emission limits for marine vessels, locomotives or other non-

road equipment. (40 CFR Pt. 89, Subpt. A, App.A; *Engine Manufacturers Assn. v. Environmental Protection Agency*, 88 F.3d. 1075 (DC Cir. 1996)).

Fuel Sulfur Limits. With respect to nonroad engines, including marine vessels and locomotives, the District and CARB have concurrent authority to establish fuel limits, such as those on sulfur content. As was noted above, fuel regulations for nonroad equipment are not preempted by the Clean Air Act and do not require EPA authorization.

Operational Limits. The District has authority under state law to establish operational limits for nonvehicular sources such as marine vessels, locomotives, and cargo handling equipment (to the extent cargo handling equipment is "nonvehicular"). As was discussed above, operational limits for nonroad equipment are not preempted by Clean Air Act. In addition, the District may adopt operational limits for motor vehicles such as indirect source controls and transportation controls without receiving an authorization or waiver from EPA. A trial court has recently rules that the District lacks authority under state law to regulate locomotives. The District Board has voted to appeal this decision.

In implementing the above authorities, the District would need to consider limitations imposed by federal law.

REFERENCES

SCAQMD, Clean Port Initiative Workplan, January 2006; Addendum A

CARB, Proposed 2003 State and Federal Strategy for the California State Implementation Plan, May 2003.

Port of Los Angeles, Port of Long Beach, Draft San Pedro Bay Ports Clean Air Action Plan, June 2005

CARB Emission Reduction Plan for Ports and Goods Movement, April 2006

No Net Increase Task Force, Report to Mayor Hahn and Councilwoman Hahn, June 2005.

CARB Diesel Particulate Matter Exposure Assessment Study of the Ports of Los Angeles an Long Beach, April 2006

EMISSION REDUCTIONS FROM THE CARL MOYER PROGRAM [NO_X AND PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ON-ROAD AND OFF-ROAD DIESEL VEHICLES AND EQUIPMENT		
CONTROL METHODS:	CARL MOYER PROGRAM		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NO_X INVENTORY	553.4	392.3	309.3
NO_X REDUCTION		7.5	12.9
NO_X REMAINING		384.8	296.4
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NO_X INVENTORY	555.6	393.6	310.5
NO_X REDUCTION		7.5	12.9
NO_X REMAINING		386.1	297.6
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	26.2	16.3	12.2
PM2.5 REDUCTION		0.2	0.4
PM2.5 REMAINING		16.1	11.8
CONTROL COST:	$14,300 PER TON		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to continue the use of the Carl Moyer Memorial Air Quality Standards Attainment Program to reduce air pollution emissions by facilitating the move to cleaner-burning engines in both on-road and off-road vehicle fleets. The Carl Moyer Program encourages early introduction of clean air technology into the on-road and off-road vehicle fleets by providing funds to help purchase new vehicles or new engines (repowers) and for installation of retrofit units on older engines. This includes funding for technologies that reduce emissions of oxides of nitrogen (NOx) and particulate matter (PM) caused by the combustion of diesel fuel in engines.

Background

In fiscal year 1998-99, the California State Legislature created the Carl Moyer Program, named in honor of a key figure in developing state air quality measures, to facilitate the move to cleaners-burning engines, which otherwise would have taken decades.

The program continues to drive early introduction of clean air technologies, and includes funding for measures that reduce NOx, VOC, and PM caused by the combustion of diesel fuel and gasoline in on-road vehicles and off-road engines. The program also funds aftertreatment devices such as diesel oxidation catalyst and PM filters.

A variety of vehicle classes and types are funded under the Carl Moyer Program to help purchase new vehicles or new engines/repowers and for installation of retrofit units on older engines. New vehicles and engines must achieve a 30 percent reduction, and repowered vehicles and retrofits must achieve a 15% reduction of NOx emissions compared to current emission standards. New engines should be CARB-certified and retrofits should be CARB-verified. Projects reducing PM and/or VOC are also eligible for funding provided they are cost-effective. Alternative fuel engines, such as those using compressed natural gas, liquefied natural gas, propane and electricity will be given preference for funding if less polluting. Cleaner diesel engines may also be considered in the off-road category.

Vehicles and equipment funded must remain in operation for at least three years, and 75 percent of their use must be within the South Coast Air Basin. All potential projects must meet cost-effectiveness requirements to be eligible for funding consideration.

The Carl Moyer Program under its new guidelines also includes "Fleet Modernization" and "Light-Duty Vehicle Repair and Scrapping" programs. The fleet modernization Program replaces pre-1990 heavy-duty diesel vehicles with 2006 and newer diesel or 2004 and newer natural gas vehicles. The Light-Duty Vehicle Repair and Scrapping Program identifies high polluting light-duty vehicles with remote sensing and offers repair or scrapping options.

Regulatory History

In addition to the legislature introducing the Carl Moyer Program, SB 1107 and AB 923 were passed with support from the business community, environmental groups, and public agencies which provide a long-term source of funding for the expansion of the Carl Moyer Program.

PROPOSED METHOD OF CONTROL

The proposed control measure is based on the implementation of the Carl Moyer Program by the District. The measure proposes to take credit for the emission reductions achieved through past and future projects funded under this program for SIP purposes, in two phases. Examples of projects include on-road heavy-duty vehicle modernization, installation of retrofit units, engine repowers, and remote sensing and repair or early retirement. Phase I of this control measure is based on the projects implemented from 1998 to 2006. Emission reductions from Phase I are estimated at 4.2 tons per day of NOx and 0.1 ton per day of PM2.5 in 2014 and 6.2 tons per day of NOx and 0.2 ton per day of PM2.5 in 2023 based on Carl Moyer Program's

emission quantification protocols taking into account CARB's baseline adjustments for these projects. The remaining reductions for Phase I are reflected in the 2007 AQMP as baseline inventory adjustments.

Phase II of this measure is based on future reductions to be achieved from the implementation of new projects under the Carl Moyer Program. These reductions were estimated based on the committed level of funding for this Program and a conservative cost-effectiveness assumption of $14,300 per ton specified in the Carl Moyer Program guidelines (although existing projects have substantially lower cost-effectiveness). The reductions are estimated to be 3.3 tons per day of NOx and 0.1 ton per day of PM2.5 in 2014, and 6.6 tons per day of NOx and 0.2 ton per day of PM2.5 in 2023. These reductions are reflected under the proposed mobile source control measures to avoid double counting. Emission reductions associated with both Phase I and Phase II are shown in the Summary Table.

Every three to five years, emission reductions from projects funded under the Carl Moyer Program will be quantified, verified, and incorporated in the revised baseline emissions as part of SIP Revision process.

EMISSIONS REDUCTION

The emission reductions from Phases I and II of the control measure are reflected in the Control Measure Summary Table. In addition, the implementation of Light-Duty Vehicle Repair and Scrapping will start generating VOC emission reductions.

RULE COMPLIANCE AND TEST METHODS

The District has developed policies and procedures to ensure that this control measure is successfully implemented. In addition to the District's requirements for program implementation, the District adheres to CARB's Carl Moyer Guidelines. Because the Carl Moyer Program is implemented by a partnership of CARB and the District, CARB has oversight authority to ensure that funds are expended as required by the Health and Safety Code and to ensure that the Carl Moyer Program Guidelines are met. CARB is required to audit the District's program by reviewing the District's solicitation, evaluation, selection, contract, and invoicing process. CARB staff also visits a sample of funded projects to ensure that public funds are used to pay for qualifying projects that are operating and obtaining emission reductions. The District's implementation of the Carl Moyer Program is outlined in Appendix IV-B-3 of the Final AQMP.

COST EFFECTIVENESS

The cost effectiveness of this control measure is based on the Carl Moyer Program guidelines which establish an upper limit of $14,300 per ton.

IMPLEMENTING AGENCY

The District has authority to implement this control measure, and CARB has oversight authority.

AB 923 LIGHT-DUTY VEHICLE HIGH-EMITTER IDENTIFICATION PROGRAM [VOC, NOX, CO]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: GASOLINE- AND DIESEL-POWERED ON-ROAD LIGHT-DUTY VEHICLES UP TO 8500 LBS. GVWR

CONTROL METHODS: REMOTE SENSING TO IDENTIFY HIGH EMITTING VEHICLES WITH REPAIR AND RETIREMENT COMPONENT

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	2002	2014	2023
VOC INVENTORY	301.1	108.7	73.2
VOC REDUCTION		0.9	0.7
VOC REMAINING		107.8	72.5
NOX INVENTORY	326.4	102.0	52.1
NOX REDUCTION		0.4	0.5
NOX REMAINING		101.6	51.6
CO INVENTORY	3099.1	1115.8	650.2
CO REDUCTION		11.2	13.0
CO REMAINING		1104.6	637.2

SUMMER PLANNING INVENTORY (SUMMER FOR VOC AND NOX; WINTER FOR CO)	2002	2014	2023
VOC INVENTORY	302.3	112.9	77.2
VOC REDUCTION		0.9	0.8
VOC REMAINING		112.0	76.4
NOX INVENTORY	311.4	97.3	49.8
NOX REDUCTION		0.4	0.4
NOX REMAINING		96.9	49.3
CO INVENTORY	3049.5	1093.8	635.0
CO REDUCTION		10.9	12.7
CO REMAINING		1082.9	622.3

CONTROL COST: NOT DETERMINED

IMPLEMENTING AGENCY: SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to implement a control strategy for purposes of identifying high emitting vehicles and augmenting the current Smog Check program applicable to gasoline- and diesel-powered vehicles up to 8,500 lbs. gross vehicle weight (GVW). These vehicles include passenger cars, vans, and light-duty pick-up trucks.

Background

Light-duty vehicles are major contributors of air pollutants in the South Coast Air Basin. While vehicle miles traveled increased more than 50% over the last 20 years, vehicle emissions have dropped by a factor of almost three due to increasingly stringent vehicle emission standards. Yet, the light and medium duty vehicle fleet continues to contribute more than a third of the Basin's total emissions of ozone and particulate matter forming pollutants in part due to high emitting vehicles. Studies show that the highest emitting 10% of the light duty fleet contribute well over 50% of the fleet's total emissions of ozone and particulate matter forming pollutants emphasizing the need to identify and repair these high emitting vehicles to ensure further emission reductions from the light duty vehicle fleet.

Motor vehicle emissions progressively increase as vehicle's age and accumulate mileage. The causes of these emissions increases are numerous, but can be broadly categorized in terms of normal deterioration of properly functioning on-board emission control system components, emission control system malfunctions due to design flaws and/or lack of proper maintenance, and tampering. In recognition that emission reductions could occur through regular emission testing of vehicles and repairing those vehicles with high in-use emissions, Smog Check programs have been established in an attempt to ensure that vehicles stay clean as they age, but room for improvements in such programs exist.

Recent studies involving roadside pull-over testing have concluded that repairs on vehicles failing smog check tests may not be lasting the full biennial cycle and may be operating on roadways as high emitters prior to the next smog check test requirements. A remote sensing program can identify these high emitting off-cycle vehicles and offer incentives to either repair such vehicles or offer incentives to retire such vehicles.

Regulatory History

On September 23, 2004, the Governor signed AB 923 (Firebaugh) which resulted in a significant increase in incentive funding for programs that achieve emission reductions from vehicular sources and off-road engines. The legislation identified and emphasized that in-use higher emitting vehicles are sources that need additional scrutiny and control in part because of their large contribution to the fleet's total emissions. To address this, the District has developed and will be implementing, under the AB923 program, a pilot program to identify and repair or retire high emitting on-road vehicles.

PROPOSED METHODS OF CONTROL

Remote Sensing To Identify High Emitting Vehicles and Require Off-Cycle Repairs or Vehicle Retirement – Currently, California vehicles less than 8,500 lbs. GVW are required to undergo Smog Check testing every two years or upon change of a vehicle's ownership. Recent studies have indicated that repairs done in conjunction with the Smog Check Test Program do not last the entire biennial cycle and result in high emitting vehicles being driven on California roadways. The implementation of a remote sensing program as a component to California's Smog Check Program will also capture those vehicles that circumvent California's Smog Check program through various techniques such as clean piping (using the clean tailpipe exhaust of one vehicle for another). The use of remote sensing programs identifying high emitting vehicles will also result in off-cycle repairs and encourage vehicle retirement of identified high emitting vehicles. The current Consumer Assistance Program (CAP) operated by BAR encourages vehicle retirement for on-cycle (those vehicles within 3 three months of its smog check test due date) vehicles that cannot pass the Smog Check Test. Vehicles identified as high emitters that are off-cycle to the smog check test are not eligible under the CAP program implemented by BAR and the State of California. This control measure would apply only to those vehicles identified as high emitters that are off-cycle to California's Smog Check Program. The benefits to the program would be the off-cycle repair or vehicle retirement occurring prior to the next smog check emission test.

EMISSIONS REDUCTIONS

Identification of high-emitting light- and medium-duty vehicles would result in estimated annual average emission reductions of VOC and NOx are 0.9 and 0.4 tons per day by 2014, and 0.7 and 0.5 tons per day by 2023.

COST EFFECTIVENESS

CARB is using the Carl Moyer $14,300 per ton threshold to calculate the cost effectiveness of the pilot program. In designing and developing a pilot program for purposes of identifying high emitting vehicles through remote sensing technology and the subsequent repair or retirement of high emitting vehicles, the cost effectiveness estimates for the program range from below the $14,300 per ton threshold at the low end and just above the $14,300 per ton threshold at the highest end. Because this program is solely reliant on a volunteer participation rate by the consumers, the exact cost effectiveness of the program is difficult to assess prior to the program implementation. In recognition of the program being a pilot program, CARB recognized this as a pilot program and has accepted the cost effectiveness analysis as being within the acceptable range of the $14,300 per ton threshold.

IMPLEMENTING AGENCY

The implementing agencies would be the South Coast Air Quality Management District under the auspices of AB 923 and guidelines set forth by CARB for the Light-Duty Vehicle Program.

REFERENCES

Gross Emitting Vehicles: A Review of the Literature, June 2004, UC Davis-Caltrans Air Quality Project, Task Order No. 27, Prepared for The California Department of Transportation. http://aqp.engr.ucdavis.edu/Documents/Gross%20Emitter%20Lit%20Review%20v11%5B1%5D.doc

Smog Check Program Evaluation Project, Prepared for CARB and BAR, Prepared by Sierra Research, Presented to California IM Review Committee, October 24, 2006 http://www.imreview.ca.gov/presentations/p_heirigs_sierra_res_10.24.06.pdf

Various Remote Sensing studies identified through Coordinating Research Council (CRC) "Recent Reports and Study Results" at website http://www.crcao.com/reports/recentstudies00-02/recent_reports_and_study_results.htm

"US Remote Sensing Legislation" http://www.rsd-remotesensing.com/legislation.asp

AB 923 MEDIUM-DUTY VEHICLE HIGH-EMITER IDENTIFICATION PROGRAM [VOC, NOx, CO]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: GASOLINE- AND DIESEL-POWERED MEDIUM-DUTY VEHICLES WITH GVWR BETWEEN 8,500 AND 14,000 LBS.

CONTROL METHODS: REMOTE SENSING TO IDENTIFY HIGH EMITTING VEHICLES WITH REPAIR AND RETIREMENT COMPONENT

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	22.0	9.6	7.0
VOC REDUCTION		0.5	0.6
VOC REMAINING		9.1	6.4
NOX INVENTORY	39.9	27.7	20.5
NOX REDUCTION		0.5	0.7
NOX REMAINING		27.2	19.8
CO INVENTORY	233.6	70.3	41.4
CO REDUCTION		5.6	6.2
CO REMAINING		64.7	35.2

SUMMER PLANNING INVENTORY (SUMMER FOR VOC AND NOX; WINTER FOR CO)	**2002**	**2014**	**2023**
VOC INVENTORY	20.8	9.1	6.7
VOC REDUCTION		0.5	0.6
VOC REMAINING		8.6	6.1
NOX INVENTORY	38.7	27.1	20.0
NOX REDUCTION		0.5	0.7
NOX REMAINING		26.6	19.3
CO INVENTORY	233.6	70.8	41.7
CO REDUCTION		5.6	6.3
CO REMAINING		65.2	35.4

CONTROL COST: NOT DETERMINED

IMPLEMENTING AGENCY: SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (MAY REQUIRE STATE LEGISLATION)

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to implement a control strategy for purposes of identifying high emitting medium-duty vehicles and augmenting the current Smog Check program applicable to gasoline- and diesel-powered vehicles between 8,500 and 14,000 lbs. gross vehicle weight (GVW). These vehicles include medium- and light-heavy-duty pick-up trucks, vans, and delivery trucks. The existing Smog Check Program only includes vehicles up to 10,000 lbs. GVW and therefore a segment of the applicable vehicles are not currently subject to any in-use test program for gaseous pollutants.

Background

Medium- and light-heavy-duty vehicles are major contributors of air pollutants in the South Coast Air Basin. While light-duty vehicle emission standards have dropped by a factor of almost three due to increasingly stringent vehicle certification standards, the medium-duty vehicle certification standards have not seen such a precipitous drop. This combined with the vehicle miles traveled increasing by more than 50% over the last 20 years and the fact that California's Smog Check Program only includes vehicles weighing up to 10,000 lbs. GVW, thereby excluding a sub-portion of this category to no in-use testing requirements, suggests that there may be a significant component of the medium-duty vehicle fleet that contribute a far greater share of the Basin's total emission of ozone and particulate matter forming pollutants. Studies show that the highest emitting 10% of the light- and medium-duty fleet contribute well over 50% of the fleet's total emissions of ozone and particulate matter forming pollutants emphasizing the need to identify and repair these high emitting vehicles to ensure further emission reductions from the medium-duty vehicle fleet.

Motor vehicle emissions progressively increase as vehicle's age and accumulate mileage. The causes of these emissions increases are numerous, but can be broadly categorized in terms of normal deterioration of properly functioning on-board emission control system components, emission control system malfunctions due to design flaws and/or lack of proper maintenance, and tampering. In recognition that potential substantial emission reductions could be generated by regularly emission testing in-use vehicles and repairing those vehicles with high in-use emissions, Smog Check programs have been established in an attempt to ensure that in-use vehicles stay clean as they age, but room for improvements in such program exist.

However, recent studies involving roadside pull-over testing have concluded that repairs on vehicles failing smog check tests may not be lasting the full biennial cycle and may be operating on roadways as high emitters prior to the next smog check test. A remote sensing program can identify these high emitting off-cycle vehicles and offer incentives to either repair such vehicles or offer incentives to retire such vehicles.

Regulatory History

On September 23, 2004, the Governor signed AB 923 (Firebaugh) which resulted in a significant increase in incentive funding for programs that achieve emission reductions from vehicular sources and off-road engines. The legislation identified and emphasized that in-use higher emitting light-duty vehicles are sources that need additional scrutiny and control in part because of their large contribution to the fleet's total emissions. To address this, CARB adopted

guidelines to achieve additional emissions reductions from the light-duty vehicle sectors. This proposal would require that current legislation (AB 923) be expanded to include medium-duty vehicles from 8,500 lbs to 14,000 lbs GVW and specify that these vehicles be included in the high-emitter identification program under the Carl Moyer Program. AB 923 funds could be used to provide financial assistance in the repair or replacement of the high-emitting vehicle.

PROPOSED METHODS OF CONTROL

Remote Sensing To Identify High Emitting Vehicles and Require Off-Cycle Repairs or Vehicle Retirement – Currently, California vehicles less than 10,000 lbs. GVW are required to undergo Smog Check testing every two years or upon change of a vehicle's ownership. Recent studies have indicated that repairs done in conjunction with the Smog Check Test Program do not last the entire biennial cycle and result in high emitting vehicles being driven on California roadways. The implementation of a remote sensing program as a component to California's Smog Check Program will also capture those vehicles that circumvent California's Smog Check program through various techniques such as clean piping (using the clean tailpipe exhaust of one vehicle for another). The use of remote sensing programs to identify high emitting vehicles will allow for also result in off-cycle repairs and encourage vehicle retirement of identified high emitting vehicles. The current Consumer Assistance Program (CAP) operated by BAR encourages vehicle retirement for on-cycle (those vehicles within 3 three months of its smog check test due date) vehicles that cannot pass the Smog Check Test. Vehicles identified as high emitters that are off-cycle to the smog check test are not eligible under the CAP program implemented by BAR and the State of California. This control measure would apply only to those vehicles identified as high emitters that are off-cycle to California's Smog Check Program. The benefits to the program would be the off-cycle repair or vehicle retirement occurring prior to the next smog check emission test.

EMISSIONS REDUCTIONS

Identification of high-emitting medium-duty vehicles with gross vehicle weight from 10,001 to 14,000 lbs. would result in estimated annual average emission reductions of VOC and NOx are 0.5 and 0.5 tons per day by 2014, and 0.6 and 0.7 tons per day by 2023.

COST EFFECTIVENESS

CARB is using the Carl Moyer $14,300 per ton threshold to calculate the cost effectiveness of the pilot program. In designing and developing a pilot program for purposes of identifying high emitting vehicles through remote sensing technology and the subsequent repair or retirement of high emitting vehicles, the cost effectiveness estimates for the program range from below the $14,300 per ton threshold at the low end and just above the $14,300 per ton level at the highest end. Because this program is solely reliant on a volunteer participation rate by the consumers, the exact cost effectiveness of the program is difficult to assess prior to the program implementation. In recognition of the program being a pilot program, CARB recognized this as a pilot program and has accepted the cost effectiveness analysis as being within the acceptable range of the $14,300 per ton threshold.

IMPLEMENTING AGENCY

The implementing agency would be the South Coast Air Quality Management District under the auspices of AB 923. The Carl Moyer guidelines set forth by CARB for Light- and Medium-Duty Vehicle Program would need to be amended to incorporate vehicles with gross vehicle weight rating from 8,500 to 14,000 lbs.

REFERENCES

Gross Emitting Vehicles: A Review of the Literature, June 2004, UC Davis-Caltrans Air Quality Project, Task Order No. 27, Prepared for The California Department of Transportation. http://aqp.engr.ucdavis.edu/Documents/Gross%20Emitter%20Lit%20Review%20v11%5B1%5D.doc

Smog Check Program Evaluation Project, Prepared for CARB and BAR, Prepared by Sierra Research, Presented to California IM Review Committee, October 24, 2006 http://www.imreview.ca.gov/presentations/p_heirigs_sierra_res_10.24.06.pdf

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"US Remote Sensing Legislation" http://www.rsd-remotesensing.com/legislation.asp

CONCURRENT REDUCTIONS FROM GLOBAL WARMING STRATEGIES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	STATIONARY AND MOBILE SOURCES OF FUEL COMBUSTION
CONTROL METHODS:	CONCURRENT REDUCTIONS FROM GLOBAL WARMING STRATEGIES
EMISSIONS (TONS/DAY):	SEE EMISSION REDUCTION SECTION
CONTROL COST:	TO BE DETERMINED
IMPLEMENTING AGENCY:	CARB, CEC, PUC, AQMD

DESCRIPTION OF SOURCE CATEGORY

This control measure seeks to claim concurrent SIP reductions from all fuel combustion source global warming strategies related to fuel efficiency improvements and renewable energy sources.

Background

There is broad scientific consensus that the increased concentrations of greenhouse gases (GHGs) in the atmosphere will lead to global climate change in this century. The industrial revolution and the increased consumption of fossil fuels (e.g., gasoline, diesel, wood, coal, etc.) have contributed to substantial increase in atmospheric levels of greenhouse gases primarily carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons. These gases trap the sun's heat in the atmosphere, like a blanket, causing the atmospheric temperatures to rise. Over time, the increased temperature could result in climate change effects such as raising sea levels, altering precipitation patterns, and changing water supplies and crop yields. Global warming could also adversely affect human health, harm wildlife, and damage fragile ecosystems. Higher atmospheric temperatures would also result in more emissions, increased smog levels, and the associated health impacts.

Regulatory History

In June 2005, Governor Schwarzenegger signed Executive Order #S-3-05 which established the following greenhouse gas targets:

By 2010, Reduce to 2000 Emission Levels
By 2020, Reduce to 1990 Emission Levels
By 2050, Reduce to 80% Below 1990 Levels

The emission levels in California were estimated to be 426 million metric tons CO2 equivalent for 1990, 473 million metric tons CO2 equivalent for 2000, 532 million metric tons CO2 equivalent for 2010, and 600 million metric tons CO2 equivalent for 2020. The Governor's goals for emission reductions were estimated to be approximately 59 and 174 million tons CO2 equivalent by 2010 and 2020, respectively.

The Executive Order created the Climate Action Team, with the California Environmental Protection (Cal/EPA) as the lead responsible for coordinating efforts from multiple agencies including California Air Resources Board (CARB), California Energy Commission (CEC), Resources Agency and Public Utilities Commission (CPUC), California Integrated Waste Management Board (CIWMB), Business, Transportation, & Housing (BT&H), and Department of Food and Agriculture (CDFA). The mission of the Climate Action Team was to develop and implement emission reduction strategies to achieve the Governor's greenhouse gas targets; and to submit a progress report to the Governor and the legislature on a biannual basis, starting in 2006.

The Climate Action Team's report, published in March 2006, recommends 46 specific emission reduction control strategies for greenhouse gas. Many of the strategies also reduce ozone, criteria and toxic pollutants. Table 3 provides a summary of 11 control measures that were adopted by various state agencies and are underway. These measures were estimated to provide approximately 22 million tons CO2 equivalent in emission reductions in 2010, and 68 million tons CO2 equivalent in emission reductions in 2020, which were about half way towards meeting the Governor's goals.

As shown in Table 4, the motor vehicle standards would provide the largest emission reductions about 30 millions tons CO2 equivalent reductions in 2020. Two other key strategies in the state are the Energy Efficiency Programs and the Renewable Portfolio Standard which contributed about 16 and 11 millions tons CO2 equivalent reductions in 2020. The 11 control strategies already adopted only provide less than half of the emission reductions needed for California, which are 22 millions ton and 68 million tons reduction in 2010 and 2020 respectively. Table 1 contains a list of additional control measures recommended by the Climate Action Team that need to be adopted in the next two years to achieve the Governor's emission reduction goals. A brief explanation of the 11 control measures already adopted and underway is presented below.

TABLE 3

Emission Reduction Strategies Underway in California[a]

Agency	Strategies	Emission Reductions (Million Tons CO_2) 2010	2020
CARB	Vehicle Climate Change Standards	1	30
	Diesel Anti-idling	1	1.2
CPUC	Accelerated Renewable Portfolio Std to 33% by 2020 (including load-serving entities [LSE])	5	11
	California Solar Initiative (Million Solar Roofs)	0.4	3
	Investor Owned Utility Energy Efficiency Programs	4	8.8
CIWMB	Achieving 50% Statewide Recycling Goal	3	3
CEC	Building Energy Efficiency Standards	1	2
	Appliance Energy Efficiency Standards	3	5
	Fuel-efficient Replacement Tires & Inflation Programs	1.5	1.5
BT&H	Green Buildings Initiative	0.5	1.8
CARB	Hydrogen Highway	Included [b]	
	Total Potential Emission Reductions	**22**	**68**

a) Climate Action Team 2006 Report to Governor Schwarzenegger and the Legislature

b) The emission benefits of Hydrogen Highway have been captured in other programs such as the motor vehicle regulations and the green building initiative.

Motor Vehicle Standards (CARB)

Regulations were adopted by the CARB in September 2004 in response to the requirements in Assembly Bill 1493, Pavley, Chapter 200, Statutes of 2002. The regulations apply to new passenger vehicles and light duty trucks beginning with 2009 model year through 2016 model year. The ARB analysis indicated that these regulations would result in 30 millions tons CO2 equivalent emission reductions by 2020.

Diesel Anti-Idling (CARB)

In July 2004, the ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling which will reduce climate change emissions by 1.2 millions tons CO2 equivalent by 2020.

Renewable Portfolio Standard (CPUC and CEC)

The Renewable Portfolio Standard (RPS), established in 2002, requires that all load serving entities achieve a goal of 20 percent of retail electricity sales from renewable energy sources by 2017. The Governor has increased this goal to 33 percent renewable which was adopted by CPUC and CEC in 2005 as described in the 2005 Energy Action Plan II. The two agencies have already commenced review of the legal, regulatory, and infrastructure changes necessary to achieve the Governor's goal. It was estimated that this measure would result in 11 millions tons CO2 equivalent emission reductions by 2020.

California Solar Initiative (CPUC)
The Governor has initiated a goal of installation 1 million solar roofs or an equivalent 3,000 MW by 2017 on new and existing residential, commercial and industrial properties, increase the use of solar thermal systems to offset the increasing demand for natural gas, use of advanced metering in solar applications, and creation of a funding source that can provide rebates over 10 years through a declining incentive schedule. In August 2006, the CPUC further outlined a detailed plan to implement this $2.9 billion California Solar Initiative over a 10-year period. This plan will be administered through Pacific Gas and Electric Company, Southern California Edison, Southern California Gas Company and the San Diego Regional Energy Office. It was estimated that this measure would result in 3 millions tons CO2 equivalent emission reductions by 2020.

Investor-Owned Utility Energy Efficiency Program (CPUC)
In September 2004, the CPUC adopted emission reduction targets for the investor-owned utility energy efficiency programs through 2013 and set savings targets for both electricity and natural gas. It was estimated that this measure would result in 8.8 millions tons CO2 equivalent emission reductions by 2020.

Achieving 50% Statewide Recycling Program (CIWMB)
Achieving the State's 50 percent recycling goal was established by the Integrated Waste Management Act of 1989, AB 939, Sher, Chapter 1095, Statutes of 1989. Currently a diversion rate of 48 percent has been achieved on a statewide basis. This measure reduces the greenhouse gas emissions associated with energy used for material extraction and production as well as methane gas emissions from landfills. The CIWMB estimated a reduction of approximately 3 millions tons CO2 equivalent in 2020.

Building Energy Efficiency Standards (CEC)
Public Resources Code 25402 authorizes the CEC to adopt and periodically update (i.e. every three years) its building energy efficiency standards which apply to newly constructed buildings, and additions to or alterations to existing buildings. Recent policies have placed priority on and established specific goals for updating of the standards promoting the combination of solar photovoltaic and high-efficiency buildings and addressing demand response. The CEC estimated a reduction of approximately 2 millions tons CO2 equivalent in 2020.

Appliance Energy Efficiency Standards (CEC)
Public Resources Code 25402 authorizes the CEC to adopt and periodically update its appliance energy efficiency standards that apply to devices and equipment using energy that are sold or offered for sale in California. New standards for a variety of appliances were adopted in December 2004. Some standards under consideration in December 2004 were delayed to further consider manufacturer comments. The CEC estimated this program would provide a savings of approximately 5 millions tons CO2 equivalent in 2020.

Fuel-Efficient Replacement Tires and Inflation Programs (CEC)
State legislation, Chapter 912, Statutes of 2001, encourages the production and use of fuel-efficient tires and directed the CEC to investigate, recommend, and implement measures to improve fuel-efficiency of vehicle tires and to set mandatory fuel efficiency standard for all

after-market tires sold in California. The CEC estimated this program would provide a savings of approximately 1.5 millions tons CO2 equivalent in 2020

Green Buildings Initiative (BT&H)

Governor Schwarzenegger's Green Building Executive Order, S-20-04, calls for a reducing of energy use in public and private buildings by 20 percent by the year 2015, as compared with 2003 levels. The Executive Order requires state agencies to take specific actions with state-owned and -leased buildings, and contains various strategies and incentives to encourage private building owners and operators in order to achieve the 20 percent target. Preliminary estimates for this control measure are approximately 1.5 millions tons CO2 equivalent emission reductions in 2020.

Hydrogen Highway (CARB)

The California Hydrogen Highway Network (CA H2 Net) is a state initiative to promote the use of hydrogen as a means of diversifying the sources of transportation energy. The CA H2 Net requires the utilizing of at least 20 percent renewable resources in the production of hydrogen to reduce climate change emissions as well as criteria and toxic pollutants. The emission reductions of this program are captured in other programs such as the motor vehicle regulations.

TABLE 4

Emission Reduction Strategies for Adoption in Next 2-Years

Agency	Strategies	Emission Reduction (Million Tons CO_2) 2010	2020
CARB	Other New Light Duty Vehicle Technology Improvements	0	4
	HFC Reduction Strategies	2.7	8.5
	Transport Refrigeration Units, Off-road Electrification, Port Electrification (ship to shore)	<1	<1
	Manure Management	1	1
	Semi Conductor Industry Targets	2	2
	Alternative Fuels: Biodiesel Blends	<1	<1
	Alternative Fuels: Ethanol	<1	3.2
	Heavy-Duty Vehicle Emission Reduction Measures	0	3
	Reduced Venting and Leaks in Oil and Gas Systems	1	1
CEC	Cement Manufacturing	<1	<1
	Municipal Utility Energy Efficiency Programs/ Demand Response	1	5.9
	Municipal Utility Renewable Portfolio Standard	<1	3.2
	Municipal Utility Combined Heat and Power	0	<1
	Municipal Utility Electricity Sector Carbon Policy	3	9
	Alternative Fuels: Non-Petroleum Fuels	TBD	TBD
CPUC	Investor-Owned Utility (IOU) Additional Energy Efficiency Programs and Demand Response	NA	6.3
	IOU Combined Heat and Power Initiative	1.1	4.4
	IOU Electricity Sector Carbon Policy	1.6	2.7
CIWMB	Landfill Methane Capture	2	3
	Zero Waste—High Recycling		3
Water Depart	Water Use Efficiency	0.4	1.2
Forestry Depart.	Forest Management	1-2	2-4
	Forest Conservation	4.2	8.4
	Fuels Management/Biomass	3.4	6.8
	Urban Forestry	0	3.5
	Afforestation/Reforestation	0	12.5
BT&H	Measures to Improve Transportation Energy Efficiency	1.8	9
	Smart Land Use and Intelligent Transportation	5.5	18
	Conservation tillage/cover crops	TBD	TBD
	Enteric Fermentation	<1	<1
	Transportation Policy Implementation	TBD	TBD
	Total Potential Emission Reductions	**39**	**197**

AB32 codifies the State goal by requiring the State GHG emissions be reduced to 1990 levels by 2020 through an enforceable statewide cap on GHG emissions which will be phased in starting on 2012. AB32 also directs CARB to develop appropriate regulations and establish a mandatory reporting system for tracking and monitoring GHG. The bill specifically requires the CARB to:

- By January 2008, adopt regulations to mandatory require reporting and verification of statewide greenhouse gas emissions, and to monitor and enforce compliance with this program, starting with the sources or categories of sources that contribute the most to statewide emissions (e.g. electric generation, coal, oil and gas plants);

- By January 2008, determine what the statewide greenhouse gas emissions level was in 1990 which must be achieved by 2020 as directed by the Governor in 2005;

- On or before June 2007, publish and make available to the public a list of discrete early action greenhouse gas emission reduction measures that can be implemented prior to January 2011; and on or before January 2010, adopt regulations to implement these measures to achieve maximum technologically feasible and cost effective emission reductions;

- On or before January 2011, adopt greenhouse gas emission limits and additional measures, above and beyond the measures identified in 2007, which may include market-based compliance mechanisms, to achieve the statewide greenhouse gas emission limits and statewide reductions.

PROPOSED METHOD OF CONTROL

Achieving reduction targets specified in AB32 would require significant development and implementation of energy efficiency technologies and extensive shifting of energy production to renewable sources, as outlined in Tables 3 and 4 above. In addition to reducing GHG emissions, such strategies could concurrently reduce emissions of criteria pollutants associated with fossil fuel combustion.

This measure proposes to quantify the concurrent emission reductions associated with Statewide GHG programs targeted at stationary and mobile sources in the Basin working with various state agencies.

Once quantified, these reductions will be incorporated in the revised baseline emissions as part of the SIP revision process.

EMISSIONS REDUCTION

Every three to five years, concurrent emission reductions associated with implementation of global warming strategies will be quantified and incorporated in the revised baseline emissions as part of the SIP revision process.

REFERENCES

Assembly Bill 32, Nunez, California Global Warming Solutions Act of 2006.

California Public Utilities Work Plan, January 2006.

California Solar Initiative, FACT Sheet, August 24, 2006.

Climate Action Team Final Report to the Governor and Legislature, March 2006.

Energy Action Plan II, California Energy Commission and Public Utilities Commission, September 2005.

Executive Order S-3-05 by the Governor of the State of California.

State Agency Work Plan, February 2006.

State Chronological Actions to Address Global Climate Change, March 2006

SECTION 2

CONTINGENCY MEASURES

INTRODUCTION

This appendix contains the contingency control measures for the 2007 AQMP. Both the state and federal Clean Air Acts require that the AQMP contain contingency measures in the event that the District fails to either achieve interim emission reduction goals or maintain adequate progress towards attainment of ambient air quality standards.

The expected progress in meeting the AQMP attainment goals, measured in terms of emission reductions, is verified through the annual auditing program called the Reasonable Further Progress (RFP) program. In the event the RFP shows that the implementation of the AQMP is not providing adequate progress and the interim emission reduction goals have not been met, the District must take action to bring forward measures that are scheduled for later adoption or implementation, or to implement certain "contingency" control measures. The contingency measures contained in this appendix are designed to ensure that an appropriate level of emission reductions progress continues to be made. In addition, these contingency measures are control options that could be instituted in addition to, or in place of, the AQMP control measures.

Contingency Measures

The 2007 AQMP contains 4 contingency control measures. Although implementation of these measures is expected to reduce emissions, there are issues that limit the viability of these measures as AQMP control measures at this time. Issues surrounding these measures include, but are not limited to the availability of District resources to implement and enforce the measure, cost-effectiveness of the measure, potential adverse environmental impacts, potential economic impacts, effectiveness of emission reductions, and availability of methods to quantify emission reductions. Table 5 lists the contingency control measures and adoption/implementation issues associated with the measure. The responsibility to adopt and implement the measures falls on the District, ARB, and EPA.

TABLE 5

Contingency Control Measures

AQMP Measure Number	Title
CTY-01	Offsetting the Potential Emission Increase Due to the Change in Natural Gas Specifications [NOx]
CTY-02	Clean Air Act Emission Fees for Major Stationary Sources [VOC and NOx]
CTY-03	Banning Pre-Tier 3 Off-Road Diesel Engines During High Pollution Days [NOx, VOC, and PM]
CTY-04	Accelerated Implementation of CARB's Mobile Source Control Measures [All Pollutants]

FORMAT OF CONTROL MEASURES

Included in each control measure description is a title, summary table, description of source category, proposed method of control, estimated emission reductions, rule compliance, test methods, cost effectiveness, and references. The type of information that can be found under each of these subheadings is described below.

Control Measure Number

Each control measure is identified by a control measure number (such as "CM #2007CTY-01") located at the upper right hand corner of every page. "CM #" is the abbreviation for "control measure number" and is immediately followed by the year of the AQMP revision (such as "2007" for 2007). The next designation represents the source category or control measure type; for example "CTY" represents contingency measure.

Summary Table

Each measure contains a table that summarizes the measure and is designed to identify the key components of the control measure. The table contains a brief explanation of the source category, control method, emission reductions, control costs, and implementing agency.

Although initial assessments to identify the potential magnitude of emission reductions and cost effectiveness of these measures may have been conducted, fully quantified emission reductions and control cost are not included at this time. If these measures should undergo rulemaking and as additional data and information becomes available, the emission reductions and cost effectiveness of these measure will further be assessed and fully quantified.

Information Contained in Measures

Similar to the stationary source control measures in Section I of this appendix, each of the measures contain the following sections:

- **Description of Source Category** provides an overall description of the source category, number of sources in the Basin, description of emission sources, and regulatory history.
- **Proposed Method of Control** includes applicable emission control technologies, expected performance such as projected control efficiency, and current applications.
- **Emission Reductions and Cost Effectiveness:** As previously indicated, emission reductions and control costs associated with the measures are not included in this appendix. As the more data and information becomes available regarding quantification of potential emission reductions, these measures will be updated.
- **Rule Compliance and Test Methods** refers to the applicable monitoring, recordkeeping and reporting requirements envisioned to ensure compliance. The test method section refers to appropriate approved District, ARB, and EPA source test methods.
- **Implementing Agency** is the agencies responsible for implementing the control measure. Also included in this section is a description of any jurisdictional issues that may affect the control measures implementation.

Contingency Measures

OFFSETTING THE POTENTIAL EMISSION INCREASE DUE TO THE CHANGE IN NATURAL GAS SPECIFICATIONS [NO_X]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	NO_X RECLAIM FACILITIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	SEE EMISSIONS REDUCTION SECTION
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The background, regulatory history, and other details pertaining to the change in natural gas specifications is described in Control Measure #2007CMB-04.

PROPOSED METHOD OF CONTROL

In conjunction with Control Measure CMB-04, any potential increase in NOx emissions attributable to natural gas quality needs to be mitigated within the same time frame. RECLAIM allocations could be considered for further reductions to mitigate this potential increase in emissions. As described in CMB-04, natural gas with higher heating value would potentially increase NOx emissions from natural gas combustion equipment.

EMISSIONS REDUCTION

Emission reductions may be needed based on the potential emission increase identified pursuant to Control Measure CMB-04. Based on Control Measure CMB-04 further analysis would be needed to assess the magnitude of this potential increase in NOx emissions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

Health and Safety (H&S) Code: §§ 40913, 40914, 40920.5, § 40406 and § 40440 (b)(1)

14 California Code of Regulations, section 15364

See Control Measure 2007#CMB-04 for further references

CLEAN AIR ACT EMISSION FEES FOR MAJOR STATIONARY SOURCES [VOC AND NOx]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	STATIONARY SOURCES OF VOC AND NOX WITH POTENTIAL TO EMIT OVER 10 TONS PER YEAR
CONTROL METHODS:	EMISSION FEES
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	SEE COST EFFECTIVENESS SECTION
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Regulatory History

This control measure was first introduced in the 1994 AQMP and then carried over to the 1997 AQMP and then the 2003 AQMP.

If a severe or extreme area fails to attain the 8 hour standard by the statutory date, the area must implement a measure requiring major stationary sources to either reduce their emissions to 80% of what they were in the attainment year, or pay an annual fee of $5,000 (adjusted for inflation) for each ton in excess of 80% of the baseline (2024).

The $5,000 (1990 dollars) per ton fee applies to every "major stationary source" of VOC emissions, whether permitted or not. The definition of major stationary source is any source with a "potential to emit" of 10 tons per year, not just sources with actual emissions of ten tons per year. Therefore, the fee should be based on total actual emissions, not just permitted emissions. However, fugitive emissions are not included in determining potential to emit (PTE) unless the sources is one of the types of facilities listed in 40 CFR Part 70, section 70.2. If the facility is already a major source, then fugitive emissions would be included in its total emissions. If the facility has taken a synthetic minor permit limiting them to less than 10 tpy, then these facilities would not be subject to the fee.

It should also be noted, pursuant to section 182(f) of the federal Clean Air Act, the plan provisions required under this subpart, which includes the fee, which are applicable to major stationary sources of VOC as well as major stationary sources of NOx. That is, unless EPA finds that additional reductions of NOx would not contribute to attainment. Since the Final 2007 AQMP proposes a NOx-heavy strategy, it is assumed that the fee applies to major NOx sources as well.

PROPOSED METHOD OF CONTROL

The l990 federal Clean Air Act requires that the AQMP include all control measures, means or techniques, including economic incentives such as fees, as may be necessary to reach attainment. Further, the Act requires that all stationary sources of VOC emissions (with PTE greater than 10 tons per year) in an extreme nonattainment area that has failed to attain the ambient air quality standard for ozone pay a fee as a penalty for such failure (Title I, Section 185).

This control measure proposes that if the federal ambient air standards are not met by the year 2024, the District shall impose an emissions fee of $5,000 (1990 dollars) per ton of VOC and NOx, separately, emitted by each major source in excess of 80 percent of the sources baseline emissions. The fee rate will be adjusted to reflect increases in Consumer Price Index since 1990 and annually to reflect increases in the CPI. The fee shall be paid for each calendar year after the year 2024 and until the area meets the 8-hour ozone standard. This fee will be in addition to the annual emission fee required by District Rule 301.

EMISSIONS REDUCTION

Implementation of this measure is expected to result in emission reductions as facilities seek to further reduce emissions to reduce the fees proposed by this measure. Projected emission reductions are uncertain at this time, and require further analysis.

TEST METHODS

The EPA and AQMD approved test methods for this measure include:

EPA METHOD 24 – DETERMINATION OF VOLATILE MATTER CONTENT,WATER CONTENT, DENSITY, VOLUME SOLIDS, AND WEIGHT SOLIDS OF SURFACE COATINGS

EPA METHOD 25 – DETERMINATION OF TOTAL GASEOUS NONMETHANE ORGANIC EMISSIONS AS CARBON

EPA METHOD 7E – DETERMINATION OF NITROGEN OXIDES EMISSIONS FROM STATIONARY SOURCES (INSTRUMENTAL ANALYZER PROCEDURE)

AQMD METHOD 25.1 – DETERMINATION OF TOTAL GASEOUS NON-METHANE ORGANIC EMISSIONS AS CARBON

AQMD METHOD 25.3 – DETERMINATION OF LOW CONCENTRATION NON-METHANE NON-ETHANE ORGANIC COMPOUND EMISSIONS FROM CLEAN FUELED COMBUSTION SOURCES

AQMD METHOD 100.1 – INSTRUMENTAL ANALYZER PROCEDURES FOR CONTINUOUS GASEOUS EMISSION SAMPLING

Additional or alternative test methods, protocols and guidelines may be used provided they are approved by EPA, ARB and AQMD.

COST EFFECTIVENESS

The cost-effectiveness of this measure is estimated to be not to exceed $5,000 (1990 dollars)/ton of VOC or NOx. It is assumed that a facility would opt to pay fees if on-site controls exceed $5,000 (1990 dollars)/ton.

IMPLEMENTING AGENCY

This measure will be implemented to give affected sources the option of reducing their emissions to 80% of baseline emissions or paying the fee on every ton above 80%. As such, the District has authority under H & S 40001 (rules to attain standards) to implement this measure.

REFERENCES

South Coast Air Quality Management District. Rule 301 - Permit Fees. Amended June 1993.

BANNING PRE-TIER 3 OFF-ROAD DIESEL ENGINES DURING HIGH POLLUTION DAYS [NOX, PM, VOC]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	OFF-ROAD CONSTRUCTION, INDUSTRIAL ENGINES
CONTROL METHODS:	REPLACE OR RETROFIT OLDER ENGINES TO TIER III EQUIVALENT OR BETTER
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to ban the operation of Tier 0, Tier 1 and Tier 2 off-road diesel engines (larger than 25 horsepower) during high pollution days.

Background

Off-road heavy-duty construction and industrial equipment account for 19% and 7% of the total NOx and PM emissions, respectively, in 2014. At least 60% of today's heavy-duty construction equipment fleets were manufactured before 1988 and not subject to new engine standards. In their study, CARB indicated that large old diesel off-road equipment remains in use for long periods of time, sometimes up to 60 years. This long life means that cleaner engines are introduced to the fleet at a very slow rate. Therefore, further emission reductions could be achieved by banning the operation of the older engines and accelerating the introduction of cleaner engines and emissions control technologies.

Regulatory History

The Federal Clean Air Act prohibits states from adopting emission standards from new engines used in construction and farming equipment less than 175 horsepower. Diesel engines greater than 175 horsepower are regulated by CARB. In August 1998, U.S. EPA adopted new emission standards pertaining to off-road diesel engines. Subsequently, in January 2000 and in December 2004, CARB adopted amendments to existing California emission standards to harmonize with the federal requirement. These amendments included a tiered approach starting from 1996 for Tier 1 to 2008-2012 for Tier 4.

CARB is currently proposing to establish declining fleet average emission levels for off-road equipment over 25 horsepower as stated in Control Measure, ARB-OFRD-04, Cleaner In-Use Off-Road Equipment, of the Proposed State Strategy for California's 2007 State Implementation Plan, January 31, 2007. The owners have the flexibility of swapping, purchasing newer cleaner engines, adding emission control devices to older engines, or even just restricting unnecessary equipment idling. CARB estimates that this measure would reduce NOx emissions by 13.8 tons per day, VOC emissions by 2.2 tons per day, and PM2.5

emissions by 2.5 tons per day by 2014; and 13.2 tons per day, VOC emissions by 2.1 tons per day, and PM2.5 emissions by 1.7 tons per day by 2020. CARB staff is currently in the process of developing a statewide regulation to implement this measure. The District is also proposing a complementary strategy for this source category to achieve additional reductions (refer to SC-OFFRD-01.)

PROPOSED METHOD OF CONTROL

In the event the SCAB fails to attain the PM2.5 standard by 2015, the District will propose to ban the use of pre-Tier 3 off-road diesel engines during high pollution days.

EMISSIONS REDUCTION

The emission reductions from this control measure have not yet been determined. They will be assessed once ARB-OFRD-04 & SC-OFFRD-01 measures are implemented.

RULE COMPLIANCE

Compliance with this control measure would be through monitoring, reporting and recordkeeping requirements under the District regulations.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined.

IMPLEMENTING AGENCY

Under state law the District has authority to establish operational requirements for nonvehicular sources (nonroad sources) such as off-road construction and industrial equipment, to the extent not preempted under federal law (Health & Safety Code Section 39002). This control measure would be implemented by the District using this authority and/or its authority to reduce emissions from indirect sources (Health & Safety Code Section 40716). While the District does not believe this would be necessary, if necessary, the District would seek authority from the EPA.

REFERENCES

CARB Proposed State Strategy for California's 2007 State Implementation Plan, January 31, 2007.

ACCELERATED IMPLEMENTATION OF CARB'S MOBILE SOURCE CONTROL MEASURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	ON-ROAD AND OFF-ROAD MOBILE SOURCES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	REDUCTIONS AS ESTIMATED IN CARB'S CONTROL MEASURES WILL BE ACCELERATED BY ONE YEAR
CONTROL COST:	COSTS AS ESTIMATED IN CARB'S CONTROL MEASURES WILL OCCUR ONE YEAR EARLIER
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

CARB's draft proposed state strategy includes a number of control measures for mobile sources and consumer products based on all available control technologies which are proposed to be implemented between 2007 and 2020. CARB includes 12 control measures for these categories as identified in Appendix IV-B-1. The intent of this contingency control measure is to accelerate the implementation schedule of those measures by one year.

Regulatory History

CARB has the responsibility for developing the state strategy component of the AQMP's overall control strategy.

PROPOSED METHOD OF CONTROL

In the event the District or Air Resources Board determines that the Basin failed to either achieve interim emission reduction goals or maintain adequate progress towards attainment of the PM2.5 and the 8-hour ozone standard, the District requests that CARB accelerate its adoption and implementation schedule for the remaining mobile source control measures in the 2007 AQMP by one year. Upon determining that an RFP milestone target has not been reached, or the District fails to demonstrate attainment for applicable air quality standards, the District will request that CARB accelerate the adoption and/or implementation of the remaining control measures that have not yet been adopted or fully implemented to the extent feasible. Accelerating the implementation schedule, although feasible, may require additional staffing resources and added implementation costs.

EMISSIONS REDUCTION

The emission reductions from the accelerated schedules of CARB's proposed control measures will be equivalent to those emission reductions projected for each individual control measure for the same milestone year and will not be altered by a change in the implementation date.

COST EFFECTIVENESS

Accelerating the implementation schedule may change the cost effectiveness associated with each measure.

IMPLEMENTING AGENCY

CARB

REFERENCES

CARB Proposed State Strategy for California's 2007 State Implementation Plan, January 31, 2007.

ATTACHMENT A

TO FINAL 2007 AQMP APPENDIX IV-A

EVALUATION OF CONTROL MEASURES

PROPOSED BY OTHER DISTRICTS/STATES

In an effort to ensure that all feasible measures are incorporated in the 2007 AQMP, in addition to the Reasonably Available Control Measures (RACM) Demonstration included in Appendix VI, staff has also reviewed and evaluated control measures proposed by other districts and states for inclusion in their respective SIPs. Specifically, staff evaluated control measures being considered by the air pollution control districts of San Joaquin Valley, Sacramento Metropolitan and San Francisco Bay Area in California as well as control measures being considered by Texas and Midwest States. This attachment provides a summary of this evaluation. In general, the rules and regulation already adopted or control measures proposed by the District as part of the 2007 AQMP are equivalent or greater stringency than the control measures being considered by these areas. District staff commits to closely monitor the evolution, adoption and subsequent implementation of these control measures by their respective areas and states. In the event there are any more stringent elements than those incorporated in District programs that emerge from this process that are feasible and cost-effective for this District, staff commits to pursue their inclusion into the District's future rulemaking activities.

A summary of the control measures and the process of developing these control measures in other air districts is provided below and is summarized in Table A-1 of Attachment A.

San Joaquin Valley Area

The San Joaquin Valley is classified as a "Serious" non-attainment area and is required to meet the 8-hour ozone standards by June 2013. As discussed in their final draft plan, published in January 29, 2007, the San Joaquin Valley District took various steps to generate concepts for control measures such as investigating control strategies and measures in other districts and agencies, analyzing all district rules affecting NOx and VOC to assess possibilities for strengthening and expanding their applicability, and conducting Town Hall meetings to gather ideas from the public. After considering a variety of factors, including technological feasibility and practicality of emission controls, emission inventories, emission reductions, control costs, rate and timing of emissions reductions, the San Joaquin Valley District published a final draft list of control measures consisting of 19 measures that could be reasonable developed and implemented by the 2012 date based on current available existing technologies. In addition, San Joaquin Valley District also introduced 20 control measures[11] where further feasibility studies are needed since information has not yet been available to satisfactorily evaluate a particular control. The list of 19 measures that could be implemented in San Joaquin Valley area by year 2012 is shown in Table A-1 of Attachment A – Control Measures from Other Districts. The San Joaquin Valley area included all of CARB's proposed control measures to reduce mobile source emissions in their final draft AQMP. Cost-effectiveness data was not provided in their plan.

[11] Twenty measures required further studies identified by the San Joaquin Valley APCD are: ICE Electrification & Pump Efficiency, Prescribed Burning, Oil Production Sumps, Heavy Crude Oil Components, Solid Fuel Fired Boilers, Small Boilers, Wine Fermentation & Storage, Asphalt Roofing Pesticide Fumigation Chambers Dryers, Asphalt Paving, Bakeries, POTW Water Treatment, Reduction of Animal Matter, Refinery Turnaround Units, Refinery Vacuum Devices, and Refinery Wastewater Separators.

As shown in Table A-1 of Attachment A – Control Measures from Other Districts, District staff includes all feasible control measures that are also included in the San Joaquin Valley's 2007 AQMP, except the control measure for wine fermentation and storage since there is no such facility in the District.

In addition, since the South Coast Basin is classified as Severe-17 for ozone non-attainment (potentially will be bumped-up to "Extreme"), the SCAQMD's draft plan includes more stringent control measures than San Joaquin's draft plan as discussed in Appendix VI – Reasonable Available Control Measures (RACM) Demonstration.

Sacramento Metropolitan

The Sacramento regional area is classified as a "Serious" non-attainment area and is required to meet the 8-hour ozone standards by June 2013. As discussed in their draft plan, the Sacramento district took various steps to generate concepts for control measures such as investigating control strategies and measures in other districts and agencies, analyzing all District rules affecting NOx and VOC to assess possibilities for strengthening and expanding their applicability, and conducting public meetings. After considering a variety of factors, including technological feasibility and practicality of emission controls, emission inventory of the source category and emission reductions, control costs, rate and timing of emissions reductions, the Sacramento regional area published a draft list of control measures consisting of 10 measures for stationary and area sources and several voluntary measures for mobile sources as shown in Table A-1 of Attachment A. The Sacramento area includes all CARB's proposed control measures to reduce mobile source emissions in their plan. Cost-effectiveness for stationary source control measures was estimated to be in a range of $1,000 - $18,000 per ton of emissions reduced.

As shown in Table A-1 of Attachment A, District staff includes all feasible control measures that are also included in the Sacramento's 2007 AQMP. In addition, as discussed in Appendix VI – Reasonably Available Control Measures (RACM) Demonstration, it contains additional control measures that are not included in the Sacramento's draft plan.

San Francisco Bay Area

With respect to 8-hour ozone standards, the Bay Area is classified as "Marginal" and is required to meet the 8-hour standards by June 2007. The Bay Area Air Quality Management District in cooperation with the Metropolitan Transportation Commission and the Association of Bay Area Governments, prepared the Bay Area 2005 Ozone Strategy to demonstrate how the San Francisco Bay Area would achieve compliance with the state one-hour air quality standard for ozone as expeditiously as practicable. The control strategies to meet the one-hour ozone standards would be relied upon in the transition to meet the 8-hour ozone standards. After carefully reviewing and analyzing a list of 390 control measure suggestions (not including transportation control measures), the Bay Area finalized a list of 38 control measures for their 2005 AQMP including:

- 15 measures for stationary sources as shown in Table A-1 of Attachment A with cost effectiveness reported from $800 per ton to $22,000 per ton emission reduced

- 4 control strategies for mobile sources, including diesel equipment idling model ordinance, green contracting model ordinance, low-emission vehicle incentives, and vehicle buy-back program, with estimated cost effectiveness ranging from $500 per ton to $40,000 per ton emission reduced
- 19 transportation control measures that cover the full spectrum of transportation strategies, including bus transit, rail transit, ferry service, carpooling and vanpooling, bicycle and pedestrian enhancements, land use programs, pricing measures, traffic management, employer programs and youth programs, and public education and episodic measures. The estimated cost-effectiveness of the transportation measures was not provided.

The Bay Area relied on CARB's proposed control measures to reduce mobile source emissions and committed to further study 20 additional control measures in the 2006-2007 time frame including areas such as refinery wastewater treatment, commercial charbroilers, cooling towers, adhesives and sealants, architectural coatings and episodic measures.

As shown in Table A-1 of Attachment A, District staff includes all feasible control measures that are also included in the Bay Area's plan; and as discussed in Appendix VI – Reasonably Available Control Measures (RACM) Demonstration, it also contains additional control measures that are not included in the Bay Area's plan.

State of Texas

The Texas Commission on Environmental Quality (TCEQ) contracted with the North Central Texas Council of Governments (NCTCOG) to evaluate and quantify potential control measures to develop the 8-hour ozone SIP for the Dallas-Forth Worth (DFW) and Houston-Galveston-Brazoria (HGB) areas. The NCTCOG subcontracted with two consultants, Environ International and the Sierra Nevada Air Quality Group, to perform the strategy development work. An initial master list consisted of 1,050 potential control strategies was developed. After a series of public meetings and further evaluation (based on criteria such as permanent, quantifiable, enforceable, surplus, practicality, likely public acceptance, timing of implementation to meet January 2009 attainment date, emissions benefit, and cost effectiveness), the NCTCOG settled on a final list of 61 control measures shown in Table A-1 of Attachment A including the following:

- 17 control measures for point and area sources, which focus on NOx reductions more than VOC reductions, including further reductions for boilers, internal combustion engines, kilns, electric generation units, cold cleaning, architectural and industrial coatings, and area source credits for energy conservation and efficiency. Cost-effectiveness was estimated to be from $100 - $20,000 per ton emission reduced.
- 11 non-road mobile strategies including aircraft emission standards, California portable engine rule, incentives for emission reductions with public funding, freight rail infrastructure improvements, hybrid-electric locomotives, lawn mower replacement program, limitations on idling of heavy-duty construction equipment, locomotive idling restrictions, rail efficiency, and Tier II standards for locomotives.

Cost effectiveness was reported to be from $1,000 - $51,914 per ton emission reduced.

32 on-road mobile strategies, including transportation control measures, such as adopting California vehicle standards, additional taxi fleet emissions testing, Texas repair and replacement assistance program, California low-emitting vehicle II standards, CARB 2007 on-highway diesel engine standards, heavy-duty and light-duty idling restriction, speed limit decrease for heavy-duty diesel trucks, expanded I/M to include diesel vehicles, higher vehicle occupancies, idle reduction infrastructure, intelligent transportation systems, freeway and arterial bottleneck programs, bicycle and pedestrian programs, congestion (value) pricing, drive-thru service restrictions, parking cash-out, pay-as-you-drive, transit off-peak pass, traffic signal improvements, and fare-free transit-system-wide on ozone action days. Cost effectiveness was estimated to be from minus $137,883 (savings) to $106,686 per ton emission reduced.

The TCQE selected a subset of 61 control measures proposed by NCTCOG to include in the proposed 2007 8-Hour SIP for Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HVB) metropolitan area. The TCQE chose to focus on measures that can be implemented by 2009 which can provide quantifiable NOx reductions from major sources such as power plants, boilers, internal combustion engines, and cement kilns units. For VOC reductions, the TCQE focused in under-estimated and under-reported sources such as storage tank's roof landing, flash emissions, degassing of storage tanks, transport vessels, and marine vessels. For on-road and off-road mobile source control measures, the TCQE recommended to adopt California mobile source standards and supported several voluntary measures proposed by the SCAQMD. The TCQE rejected all the control measures that were not included in the SCAQMD's 2007 AQMP based on the reasons that these measures either would not accelerate the attainment date, were not enforceable, emission reductions could not be quantified or would not be significant, or would potentially have adverse impacts. As shown in Table A-1 of Attachment A, the SCAQMD's Final AQMP includes all control measures that are recommended by the TCQE for the Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HVB) metropolitan areas in their 2007 draft AQMPs.

Midwest States

The five states of the Midwest Regional Planning Organization (RPO), including Illinois, Michigan, Wisconsin, Indiana, and Ohio, are considering adopting additional control measures as part of their planning to achieve regional haze goals and to attain the ozone and PM2.5 National Ambient Air Quality Standards (NAAQS). The Lake Michigan Air Directors Consortium (LADCO) issued a contract to MACTEC Engineering and Consulting to identify and evaluate candidate control measures to support the state's air quality planning activities. Under this contract, MACTEC was tasked to identify candidate control measures for regional haze, PM2.5, and ozone; collect information to support the Best Available Retrofit Technology (BART) engineering analysis required by the regional haze rules; conduct a technical and economic assessment of available control measures; and conduct a comprehensive assessment of Reasonably Available Control Technology (RACT) for VOC and NOx.

MACTEC carefully reviewed hundreds of control measures and recommended a preliminary list of 70 control measures. After further analyses using criteria such as costs for implementation, and timing to implement the control measures to meet the attainment dates, MACTEC finalized a list of 17 control strategies focusing on further control electric generating units; industrial, commercial, and institutional boilers; petroleum refineries; iron and steel plants, Portland cement plants, chemical plants, industrial surface coating, industrial solvent cleaning (degreasing), architectural and industrial maintenance (AIM) coatings; printing presses; portable fuel container, auto refinishing, consumer solvents, gasoline dispensing facilities; asphalt paving; gasoline highway vehicles, diesel trucks and non-road engines. Cost-effectiveness of the control measures was reported from $200 - $20,000 per ton VOC reduced, $700 - $4,493 per ton NOx, and $800 - $6,912 per ton SOx.

As shown in Table A-1 of Attachment A, District staff includes all control measures that are suggested by the Midwest RPO to their five states including Illinois, Michigan, Wisconsin, Indiana and Ohio.

TABLE A-1

Control Measures from Other Districts

This table lists the proposed control measures developed by San Joaquin Valley, Sacramento, Bay Area, North Central Texas Council of Governments, and Lake Michigan Air Directors Consortium (LADCO) or Midwest Regional Planning Organization (Midwest RPO) for their respective ozone plans. The District's current rules and regulations have equivalent or greater stringency than other agencies' rules and regulations and proposed control measures in their respective SIPs with few exceptions, and as discussed in Appendix VI, the District commits to monitor the rule development of other agencies and, if necessary, further study and reevaluate the feasibility, costs and cost effectiveness, and air quality benefits of further controls.

Control Measure Concept	**2007 AQMP Control Measure [2]**
San Joaquin's Control Strategies for Stationary Sources [1]	
Develop alternatives for open burning	BCM-04
Increase best management practices and add-on control for confined animal facilities	MCS-07
Lower NOx standards for boilers, steam generators and process heaters rating 2-5 mmbtu/hr (potentially 9ppmv with low NOx and 6 ppmv with SCR and SNCR)	MCS-07
Promote the use of electric heaters to replace boilers, steam generators and process heaters from 2-5 mmbtu/hr by incentives	FLX-01
Lower NOx standards for boilers, steam generators and process heaters rating more than 5 mmbtu/hr to 6 ppmv potentially ppmv with SCR and SNCR	MCS-07
Lower NOx standards for stationary gas turbines by 50% (current at 5 ppmv-50 ppmv for gas-fueled turbines, 3 ppmv for units >10 MW combined cycle, 25 ppmv -50 ppmv for liquid fueled turbines)	MCS-07
Promote electrification and accelerate replacement of ICEs less than 50 bhp by incentives	FLX-01
Lower NOx limit for glass melting furnaces (SCR technology)	MCS-07
Lower NOx limit for residential water heaters based on South Coast Rule 1121 limit and accelerate replacement with electric units through incentives	FLX-01
Develop Alternative Compliance Programs for previously regulated sources where additional controls are determined to be extremely expensive (e.g. large boilers)	FLX-01
Further control on composting and biosolids, implementing BACT and other districts measures.	MCS-07
Composting Green Waste	MCS-04

Note: 1) San Joaquin Valley developed and included 19 control measures as shown in this table for their 2007 AQMP; and identified additional 20 areas that would require further studies that would be conducted in 2008-2012; 2) In Control Measure MCS-07, the District commits to monitor the rule development of other agencies, and conduct further analysis to determine the feasibility, air quality benefits, and incremental costs/cost effectiveness of further controls if needed. In Control Measure FLX-01, the District proposes to implement a Carl Moyer-type incentive program for stationary sources.

TABLE A-1 (continued)

Control Measures from Other Districts

Control Measure Concept	2007 AQMP Control Measure [2]
Polystyrene Foam Operations – Lower VOC limits or increase control efficiency of control equipment.	MCS-01 MCS-07
Wine Fermentation and Storage	No Source
Flares Control – incorporating experiences from BAAQMD and SCAQMD rules	Existing rule in place
Soil Decontamination – Increase overall capture and control efficiency and eliminate allowances for aeration	MCS-07
Gasoline Storage & Transfer – Removal of exemptions, increase inspection frequency, increase control efficiency, and implementing other measures	MCS-07
Aviation Fuel Transfer – Reduce emissions associated with loading/unloading and fugitive emissions associated with aviation fuel transfer and storage	MCS-07
Architectural Coatings Rule – Lower VOC limits to match those in other districts such as SCAQMD and where possible provide incentives for non-use of high VOC coatings during high ozone days.	SC-LTM-03
Solvent Cleaning Operations – Lower allowable VOC content to match other air districts	MCS-07
Adhesives – Lower certain VOC limits, increase control efficiency requirements to 95%, require use of HVLP spray equipment.	MCS-07
Sacramento's Control Strategies for Stationary Sources	
Architectural Coatings –Lower VOC limits	SC-LTM-03
Automotive Refinishing – Lower VOC limits	MCS-07
Degreasing/Solvent Cleaning – Lower VOC limits	MCS-07
Graphic Arts–Lower exemption level & cleaning solvent limits	MCS-07
Natural Gas Production and Processing – Establish leak inspection frequencies and repair periods	FUG-01
Unspecified Coatings - Impose VOC limitations for coating operations that have not been covered by the existing rules, establish requirements for transfer efficiency, surface preparation and cleanup	MCS-07
Asphalt Concrete - Low NOx burners/Flue gas re-circulation	MCS-07
Boilers, Steam Generators, and Process Heaters – Lower standards	MCS-07
IC Engines - High percentage of the engines are registered as emergency power backup. Require installation of new emissions reduction technologies	MCS-07
Large Water Heaters and Small Boilers – Establish limit for units from less than 75,000 btu/hr – 1 mmbtu/hr.	MCS-07

Note: 2) There are two general District's control measures in this table: a) Control Measure MCS-07 – Application of All Feasible Measures in which the District commits to monitor the rule development of other agencies, and conduct further analysis to determine the feasibility, air quality benefits, and incremental costs/cost effectiveness of further controls if needed.; and b) Control Measure FLX-01 – Economic Incentive Programs in which the District proposes to implement a Carl Moyer-type incentive program for stationary sources.

TABLE A-1 (continued)

Control Measures from Other Districts

Control Measure Concept	2007 AQMP Control Measure [2]
Bay Area's Control Strategies for Stationary Sources	
Auto Refinishing - Reduce VOC limits for some coating categories	MCS-07
Graphic Arts Operations - Reduce VOC limits for flexographic ink and clean up solvent	MCS-07
High Emitting Spray Booths - Require additional controls on spray booths that emit >20 tons per year	MCS-07
Polyester Resin Operations - Reduce allowable monomer content for some types of polyester resins	MCS-07
Wood Coating Operations - Reduce VOC limits for some coating categories	MCS-07
Flares - Minimize flaring	MCS-07
Gasoline Bulk Terminals and Plants - Require automatic shutoff and backpressure monitors, set more stringent leak, emission standards	MCS-07
Marine Loading Operations - Control additional categories, set more stringent leak standards and/or control housekeeping emissions	MCS-07
Organic Liquid Storage - Tighten existing requirements and/or control lower vapor pressure liquids	MCS-07
Pressure Relief Devices - Improve enforceability of rule	MCS-07
Wastewater Systems - Control emissions from wastewater collection systems	MCS-07
Industrial, Institutional and Commercial Boilers - Extend existing limits to smaller boilers and/or set a more stringent standard	MCS-07
Large Water Heaters and Small Boilers - Require new, small boilers and large water heaters to meet NOx limits	MCS-07
Stationary Gas Turbines - Implement BARCT NOx limits on existing turbines	MCS-07
Energy Conservation - Educate government, industry and the public in energy efficient choices	MCS-03
North Central Texas's Control Strategies	
• **Stationary Sources**	
Adopt BARCT to existing sources and BACT to new sources of electric generating units, boilers, petroleum refineries, iron/steel plants, Portland cement and chemical plants	MCS-07
Architectural & Industrial Coatings	MCS-01
Area Source Credit for Energy Conservation and Efficiency	MCS-03
Cold Cleaning Regulations	MCS-07
Commercial and Consumer Products Requirements	MCS-07 SC-LTM-03

Note: 2) There are two general District's control measures in this table: a) Control Measure MCS-07 – Application of All Feasible Measures in which the District commits to monitor the rule development of other agencies, and conduct further analysis to determine the feasibility, air quality benefits, and incremental costs/cost effectiveness of further controls if needed.; and b) Control Measure FLX-01 – Economic Incentive Programs in which the District proposes to implement a Carl Moyer-type incentive program for stationary sources.

TABLE A-1 (continued)

Control Measures from Other Districts

Control Measure Concept	2007 AQMP Control Measure [2]
Fuel Hose Permeation	None
Glycol Dehydrators	MCS-07
NOxEAT Software	None
Boilers & Heaters (All types)	MCS-07
Stationary IC Engines	MCS-07
Kilns (e.g. lime, aggregate, brick, Portland cement)	MCS-07
Alternate Energy Sources to Reduce Emissions from Electricity Generation	FLX-01
• **Mobile Sources**	
Aircraft Emissions Standards	EPA's Jurisdiction
California Portable Engine Rule	Existing Rule
Emission Reduction Contract Incentives with Public Funding	
Enhanced TERP Program – provide funds for HHDT retrofit/replacement	MOB-04
Freight Rail Infrastructure Improvements	TCM
Lawn Mower Replacement Program	MOB-02
Limitations on Idling of Heavy-Duty Construction Equipment	ARB-OFFRD-04
Locomotive Idling Reductions	Existing Rule 3502
Hybrid-Electric Locomotives	ARB-OFFRD-02 SC-OFFRD-04
Tier II Locomotive Emission Standards	ARB-OFFRD-02 SC-OFFRD-04
1974 and Older Model Year Vehicles I/M Exemption	ARB-ONRD-01
Additional Taxi Fleet Emissions Testing	ARB-ONRD-01
AirCheck Texas Repair and Replacement Assistance Program	None
Bicycle and Pedestrian Programs	TCM
California Low Emitting Vehicle (LEV) II Standards	Existing Std
CARB 2007 On-Highway Diesel Engine Standards	Existing Std
Clean Fleet Vehicle Procurement Policy/Clean Fleet Program	ARB-ONRD-04
Congestion (Value) Pricing	None
Drive-Thru Service Restrictions	None
ETR-Best Workplaces Program	TCM
ETR-Transit Subsidy Programs	TCM
ETR-Vanpool/Carpool Programs	Existing Program
Expanded I/M to Include Diesel Vehicles	ARB-ONRD-01
Freeway and Arterial Bottleneck Program	TCM
Heavy-Duty Vehicle Idling Restriction and Policy	Existing Std
Higher Vehicle Occupancies	TCM
Idle Reduction Infrastructure	Existing Program

Note: 2) There are two general District's control measures in this table: a) Control Measure MCS-07 – Application of All Feasible Measures in which the District commits to monitor the rule development of other agencies, and conduct further analysis to determine the feasibility, air quality benefits, and incremental costs/cost effectiveness of further controls if needed.; and b) Control Measure FLX-01 – Economic Incentive Programs in which the District proposes to implement a Carl Moyer-type incentive program for stationary sources.

TABLE A-1 (continued)

Control Measures from Other Districts

Control Measure Concept	2007 AQMP Control Measure [2]
Intelligent Transportation Systems	TCM
Light-Duty Vehicle Idling Restriction and Policy	None
Military Ground Equipment Emissions Testing	None
Lower Reid Vapor Pressure	ARB-ONRD-03
Traffic Signal Improvements	TCM
Transit Off-Peak Pass	TCM
Stricter I/M Policy Enforcement	ARB-ONRD-1
Speed Limit Decrease for Heavy Duty Diesel Trucks	None
Parking Cash-Out	None
Pay-As-You-Drive	None
Fare-Free Transit, System-Wide on Ozone Action Days	None
Midwest RPO's Candidate Control Strategies for Stationary Sources	
Adopt BARCT to existing sources and BACT to new sources of electric generating units, boilers, petroleum refineries, iron/steel plants, Portland cement and chemical plants	On-going Program MCS-07
Cold cleaning – Establish above RACT standards for degreasing, cold cleaning (vapor pressure maximum of 1 mm Hg at 68 degrees F & VOC limit of 0.21 lb/gal)	
Vapor degreasers - Expand MACT standards to all vapor degreasers, regardless of solvent types	Existing Std
Lithographic printing - Adopt 90% control efficiency and more stringent VOC limits (e.g. SCAQMD limits) for inks, coatings and fountain solutions	MCS-07
Rotogravure and flexographic printing - Adopt MACT standards for control equipment, 100% capture efficiency, 92% overall control efficiency for publication, 95% for other gravure and flexo	MCS-07
Petroleum Tanks - Lower tank size applicability for petroleum external floating roof tanks and fixed roof tanks (e.g. include 10,000 gallons tanks) and make requirements more stringent	MCS-07
Automotive Coating and Refinishing – Increase RACT stringency 100% capture and 95% control efficiency	MCS-07
Metal Can Coating – Increase RACT stringency 100% capture, 97% control for new sources, and 95% for existing.	MCS-07
Paper and other web surface coating – Lower VOC limit to 2.2 lbs/gal or increase RACT stringency to 100% capture, 90 % -95% control	MCS-07
Wood furniture coating – Adopt SCAQMD VOC limits and revisit the exemption level	Existing Std

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