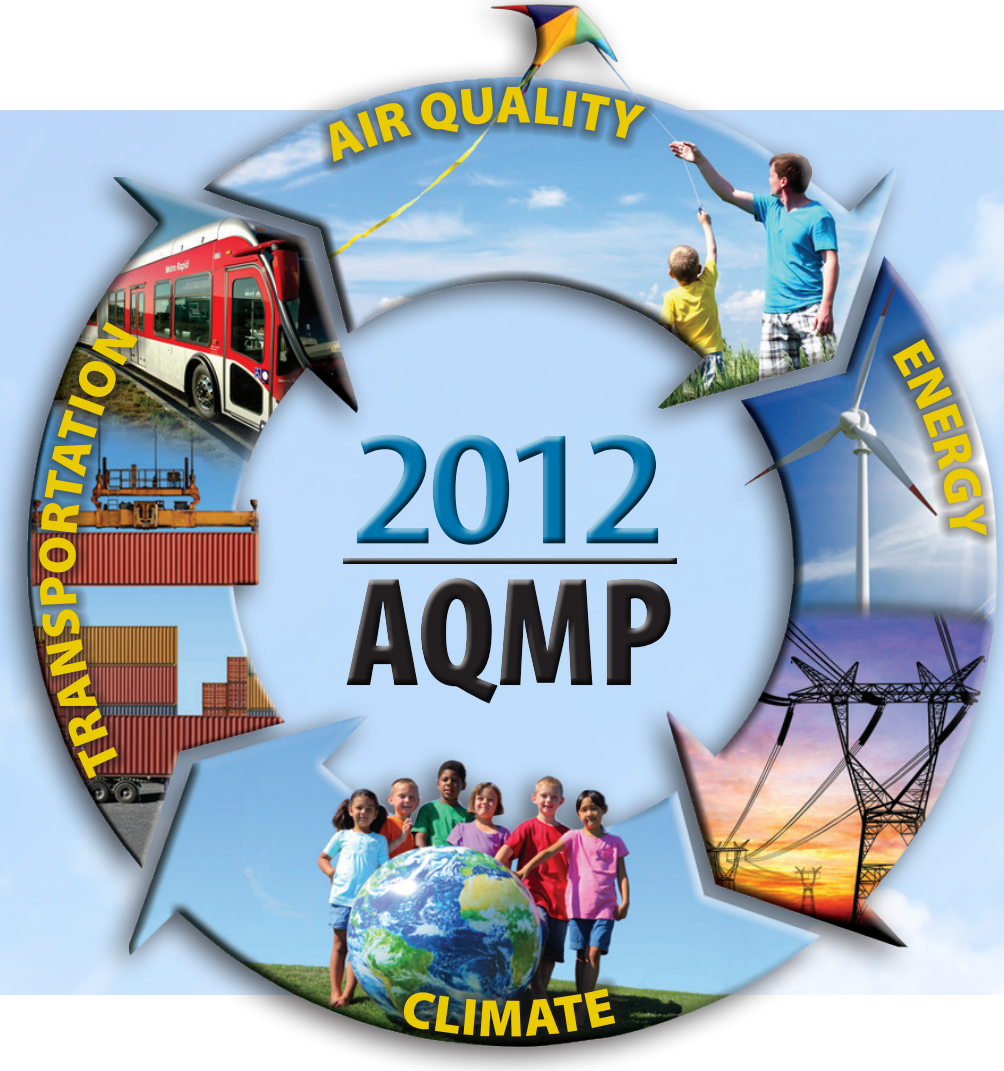
Appendix IV-A

Air Quality Management Plan



District's Stationary Source Control Measures

December 2012

South Coast Air Quality Management District
Cleaning the air that we breathe...
AQMD

FINAL 2012 AQMP
APPENDIX IV-A

DISTRICT'S STATIONARY SOURCE CONTROL MEASURES

DECEMBER 2012

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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 indirect source control measures to be included in the Final 2012 AQMP. Control measures presented in this appendix are short-term PM2.5 control measures and 8-hour ozone measures designed to reduce the reliance on long-term CAA Section 182(e)(5) emissions reductions in the 2007 AQMP. The proposed 8-hour ozone measures are designed to further implement the 8-hour ozone plan, but also will help to reduce PM2.5 levels and aid attainment with current and future PM2.5 NAAQS. The measures are based on a variety of incentive programs and control strategies that are likely commercially available and/or technologically feasible in the next several years.

SHORT-TERM PM2.5 CONTROL MEASURES

The Final 2012 AQMP includes eight short-term control measures (including five stationary source, one indirect source, and one education and outreach measure) developed by the District staff that are to be adopted and implemented prior to 2014. Table IV-A-1 provides the expected adoption date, implementation date and expected emission reductions achieved. There are four measures that were carried over from the 2007 AQMP and denoted with "formerly" under the new control measure number. The remaining 3 control measures are newer ideas or strengthening of existing rules.

TABLE IV-A-1

Short-Term PM2.5 Control Measures

NUMBER	TITLE	ADOPTION	IMPLEMENTATION PERIOD	REDUCTION (TPD)
CMB-01	Further NOx Reductions from RECLAIM [NOx] –*Phase I*	2013	2014	2-3 [a]
BCM-01	Further Reductions from Residential Wood Burning Devices [PM2.5]	2013	2013-2014	7.1 [b]
BCM-02	Further Reductions from Open Burning [PM2.5]	2013	2013-2014	4.6 [c]
BCM-03 (*formerly BCM-05*)	Emission Reductions from Under-Fired Charbroilers [PM2.5]	Phase I – 2013 (*Tech Assessment*) Phase II - TBD	TBD	1 [d]
BCM-04	Further Ammonia Reductions from Livestock Waste [NH3]	Phase I – 2013-2014 (Tech Assessment) Phase II - TBD	TBD	TBD [e]

TABLE IV-A-1 (concluded)

Short-Term PM2.5 Control Measures

NUMBER	TITLE	ADOPTION	IMPLEMENTATION PERIOD	REDUCTION (TPD)
~~IND-01 (*formerly MOB-03*)~~	~~Backstop Measures for Indirect Sources of Emissions from Ports and Port-Related Sources [NOx, SOx, PM2.5]~~	~~2013~~	~~12 months after trigger~~	~~N/A~~ [f]
EDU-01 (*formerly MCS-02, MCS-03*)	Further Criteria Pollutant Reductions from Education, Outreach and Incentives [All Pollutants]	Ongoing	Ongoing	N/A [f]
MCS-01 *(formerly MCS-07)*	Application of All Feasible Measures Assessment [All Pollutants]	Ongoing	Ongoing	TBD [e]

a. Emission reductions are included in the SIP as a contingency measure.
b. Winter average day reductions based on episodic conditions and 75 percent compliance rate.
c. Reduction based on episodic day conditions.
d. Will submit into SIP once technically feasible and cost effective options are confirmed.
e. TBD are reductions to be determined once the technical assessment is complete, and inventory and control approach are identified.
f. N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach, incentive programs) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.

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.

Emission reductions associated with the District's SIP commitment to adopt and implement emission reductions from sources under the District's jurisdiction are being proposed. 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. More detailed discussion on the District's SIP commitment is included in Chapter 4 of the Final 2012 AQMP.

The following sections provide a brief overview of the specific source category types targeted by short-term PM2.5 control measures.

Combustion Sources

This category includes one control measure that seeks further NOx emission reductions from RECLAIM sources.

PM Sources

This source category has four control measures being considered to reduce the PM2.5 emissions. The first two measures are designed to address those areas with high PM2.5 ambient concentrations by use of episodic controls to reduce emissions from residential wood combustion and open burning. One measure considers Basin-wide curtailment of wood burning devices (wood stoves and wood burning fireplaces) and the other open burning (i.e., prescribed or agricultural burning) when areas of historically high PM2.5 concentration are forecast to exceed the PM2.5 24-hour standard. One measure would seek further reductions from restaurant charbroiling operations and another measure would also reduce ammonia emissions from livestock waste, specifically dairies. These latter two measures require a phased approach with a technological feasibility assessment as the first phase.

Multiple Component Systems

The measure reduces emissions by applying all feasible control measures to the various source categories, should any new control measure become available prior to the next AQMP revision.

Indirect Sources

This measure will be designed to ensure emissions at the ports and port-related sources are meeting the targets projected in the 2012 AQMP for the PM2.5 attainment demonstration.

Educational Programs

A proposed educational control measure seeks to provide outreach and incentives for consumers to contribute to clean air efforts. Examples include the usage of energy efficient products, new lighting technology, "super compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials which reduce energy demand by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental effects and benefits from conservation. Finally, educational and incentive tools to be used include social comparison of energy usage and efficiency, social media, public/private partnerships. Detailed descriptions of each measure can be found in Section 2 of this appendix.

8-HOUR OZONE MEASURES

There are 16 stationary source 8-hour ozone measures with the majority anticipated to be adopted in the next 2 – 3 years and implemented after 2015, thus assisting in further implementation of the 8-hour ozone plan by 2024. These measures include two incentive programs and one educational measure. Section 182(e)(5) of the Clean Air Act allows "extreme" ozone areas to include measures in their Plan that rely on the

development of new technology or advancement of existing technology. These are commonly referred to as "black box" measures. The 8-hour ozone measures in the 2012 AQMP specify current opportunities for emissions reductions and thus are designed to reduce the reliance on the "black box" commitments in the 2007 AQMP.

There are two measures that were continued from the 2007 AQMP. The remaining 14 control measures are new ideas or revised previous measures (e.g., further reductions from an existing rule). Table IV-A-2 provides the expected adoption date, implementation date and expected emission reduction achieved.

TABLE IV-A-2

8-hour Ozone Measures

NUMBER	TITLE	ADOPTION	IMPLEMENTATION PERIOD	REDUCTION (TPD)
CTS-01	Further VOC Reductions from Architectural Coatings (R1113) [VOC]	2015 – 2016	2018 - 2020	2-4
CTS-02	Further Emission Reduction from Miscellaneous Coatings, Adhesives, Solvents and Lubricants [VOC]	2013 – 2016	2015 - 2018	1-2
CTS-03	Further VOC Reductions from Mold Release Products [VOC]	2014	2016	0.8 – 2
~~CTS-04~~	~~Further VOC Reductions from Consumer Products [VOC]~~	~~2013 – 2015~~	~~2018~~	~~N/A~~[a]
CMB-01	Further NOx Reductions from RECLAIM [NOx] – *Phase II*	2015	2020	1-2 [b]
CMB-02	NOx Reductions from Biogas Flares [NOx]	2015	Beginning 2017	Pending [c]
CMB-03	Reductions from Commercial Space Heating [NOx]	Phase I – 2014 (Tech Assessment) Phase II - 2016	Beginning 2018	0.18 by 2023 0.6 (total)
FUG-01	VOC Reductions from Vacuum Trucks [VOC]	2014	2016	1 [d]
FUG-02	Emission Reduction from LPG Transfer and Dispensing [VOC] – *Phase II*	2015	2017	1-2
FUG-03	Further Reductions from Fugitive VOC Emissions [VOC]	2015 -2016	2017-2018	1-2
MCS-01 *(formerly MCS-07)*	Application of All Feasible Measures Assessment [All Pollutants]	Ongoing	Ongoing	TBD [e]
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting) [VOC]	2015	2016	1 [d]

TABLE IV-A-2 (concluded)

8-hour Ozone Measures

NUMBER	TITLE	ADOPTION	IMPLEMENTATION PERIOD	REDUCTION (TPD)
MCS-03 (*formerly MCS-06*)	Improved Start-up, Shutdown and Turnaround Procedures [All Pollutants]	Phase I – 2012 (*Tech Assessment*) Phase II – TBD	Phase I – 2013 (*Tech Assessment*) Phase II - TBD	TBD [e]
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies [NOx]	2014	Within 12 months after funding availability	TBD [e]
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	2014-2015	Beginning 2015	N/A [a]
EDU-01 (*formerly MCS-02, MCS-03*)	Further Criteria Pollutant Reductions from Education, Outreach and Incentives [All Pollutants]	Ongoing	Ongoing	N/A [a]

a. N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach, incentive programs) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.
b. If Control Measure CMB-01, RECLAIM Phase I, contingency measure emission reductions are not triggered and implemented, Phase II will target a cumulative 3-5 TPD of NOx emission reductions.
c. Pending because emission reductions will be provided prior to the Final.
d. Reductions submitted in SIP once emission inventories are included in the SIP.
e. TBD are reductions to be determined once the inventory and control approach are identified.

The following sections provide a brief overview of the specific source category types for the 8-hour ozone measures. Detailed descriptions of each measure can be found in Section 3 of this appendix.

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 one control measure that seeks further VOC emission reductions from architectural coatings and another from mold release products. The third control measure would further reduce VOC emissions from a number of existing rules that regulate miscellaneous coatings, adhesives, solvents and lubricants.

Combustion Sources

This category includes three measures targeting stationary combustion equipment. There is one control measure that seeks further NOx emission reductions from RECLAIM sources. In addition, there is one new control measure that reduces NOx emissions from landfill and wastewater treatment flares. The last measure seeks to reduce NOx emissions from commercial space heaters.

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 vacuum truck venting and LPG transfer and dispensing.

Multiple Component Sources

There are a total of three 8-hour ozone measures in this category. One measure will achieve further VOC emission reductions from greenwaste processing such as chipping and grinding operations not associated with composting. Another control measure seeks to minimize emissions during equipment start up and shut down and the last measure reduces emissions by applying all feasible control measures to a variety of source categories.

Incentive Programs

This category includes two control measures that incentivize early reductions and advancement of zero and near-zero technologies. One measure promotes and encourages the installation of cleaner, more efficient combustion equipment through economic incentive programs, subject to the availability of public funding. Incentives may include grants for new purchases of equipment as well as loan programs in areas where long-term cost savings from increased efficiency are achieved. Another measure is aimed at providing incentives for companies to manufacture zero and near-zero emission technologies locally, thus populating the market, potentially lowering the purchase cost, and increasing demand. With availability and usage of such technologies, air quality benefits will be achieved. This proposed measure focuses on two elements: 1) process the required air permit(s) in an expedited manner; and 2) assistance in the preparation of the applicable CEQA document. A stakeholder process will be initiated to design the program and collaborate with other existing AQMD or local programs.

Educational Programs

A proposed educational control measure seeks to provide outreach and incentives for consumers to contribute to clean air efforts. Examples include the usage of energy efficient products, new lighting technology, "super compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials which reduce energy demand by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental effects and benefits from conservation. Finally, educational and incentive tools to be used include social comparison of energy usage and efficiency, social media, public/private partnerships.

District's Mobile Source Control Measures

The District is proposing control measures for mobile sources that can be found in Appendix IV (B).

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. It describes a method to account for the reality that not all facilities covered by a rule are in compliance with the rule 100 percent of the time. In 1992, EPA suggested a default value of 80 percent[1] if emission reductions are estimated based on projected control device efficiencies. If a higher rule effectiveness value is used, the District needs to demonstrate how these emission reductions will be achieved. In 2005, EPA revised its policy[2] in recognition that rule effectiveness can vary widely between different types of industry. So, instead of assuming a broad 80 percent default value for rule effectiveness, a list of factors should be considered that are most likely to affect rule effectiveness when developing emission inventories and attainment demonstrations. According to the EPA[3], it is not necessary to adjust the rule effectiveness when emissions can be calculated by means of a direct determination because the emissions estimate is not contingent on the effectiveness of controls. A direct determination is the one in which emissions are calculated directly (e.g., based on explicit records of coating or solvent types used) rather than from estimates of uncontrolled emissions and level of control. In a recent EPA response[4] to a comment on this issue, requiring stringent compliance

[1] "Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CP State Implementation Plan Base Year Inventories." EPA-452/R-92-010, November 1992

[2] "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, " EPA-454/R-05-001, August 2005, Appendix B

3 "Rule Effectiveness Guidance: Integration of Inventory, Compliance and Assessment Applications," EPA 452/R-94-001, January 2004

[4] "Approval of Air Quality Implementation Plans; California; South Coast; Attainment Plan for 1997 8-Hour Ozone Standards," EPA-R09-OAR-2011-0622, Final Rule, March 1, 2012

monitoring and reporting requirements also supports the use of the highest range of rule effectiveness factors in projecting emissions.

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. In some cases, such as emission reductions from architectural coatings, the emissions are calculated by means of direct determination. The District's ongoing source testing and on-site inspection programs also strengthen the status of compliance verification. In addition, the District conducts workshops, and 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 majority of control measures proposed in this appendix with quantifiable emission reductions are based on a rule effectiveness of 100 percent. With respect to implementation of existing rules, emissions reported through the District's AER program are based on actual emissions, substantiated by source testing or manufactured data. Otherwise, more conservative default emission factors are used. Any upset conditions or emissions under variance were also included in the AER. Where there was known non-compliance, emissions were adjusted to reflect the conditions. For example, only 75 percent compliance rate is assumed for gas stations (Rule 461) and metal coating applications (Rule 1107).

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 #CTS-01" 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 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.

- BCM Best Available Control Measures for Fugitive Dust Sources
- CMB Combustion Sources

- CTS Coatings and Solvents
- FUG Fugitive VOC Emissions
- MCS Multiple Component Sources
- IND Indirect Sources
- INC Incentive Programs
- EDU Educational Programs

If the measure is based on a control measure from the 2007 AQMP, the former control measure number appears in parentheses after the 2012 AQMP number. For example, 2012 AQMP Control Measure CM #BCM-03 – Emission Reductions from Under-Fired Charbroilers would also have the designation (*formerly BCM-05*).

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, baseline emissions, 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 whether the source category was identified in 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 level 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 identify 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 incentive programs that will become available in the future from the implementation of control measure CM #INC-01. Examples of incentive programs currently available and future enhancements to those incentive programs would be described in this section.

Emissions Reduction

The emission reductions are estimates based on the baseline inventories prepared for the 2012 AQMP and are provided in the Control Measure Summary Table. For PM2.5 measures, the emissions data are based on the annual average inventory. For the ozone strategy, the summer planning inventory is used. The emissions section of the summary table includes the 2008, 2014, 2019 and 2023 inventory. The 2014, 2019 and 2023 emission projections reflect implementation of existing adopted rules. Based on the expected reductions associated with implementing the control measure, emission data are calculated for 2019 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 may consist 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, recordkeeping, and submittal of compliance plans (when applicable).

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 a Governing Board approved cost-effectiveness method used to calculate the cost-effectiveness of each control measure. This method was approved by the District and has been consistently used over the past decades. It provides an effective tool to compare with past regulatory actions. As control measures undergo the rule making process, more detailed control costs will be developed.

The cost effectiveness values contained herein represent the best available information at this time. As additional information on technology improvement over time, more accurate numbers of affected facilities, and existing processes become available, the cost effectiveness will be revised and analyzed during actual rulemaking.

Implementing Agency

This section identifies the agency(ies) responsible 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.

Section 2

Short-Term PM2.5 Control Measures

CMB-01: FURTHER NO_X REDUCTIONS FROM RECLAIM - PHASE I [NO_X]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	VARIOUS RECLAIM NO_X SOURCES		
CONTROL METHODS:	VARIOUS CONTROL TECHNOLOGIES AND METHODS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2008**	**2014**	**2023**
NO_X INVENTORY	23.05	26.48	26.48
NO_X REDUCTION – PHASE I		2*-3	2* - 3
NO_X REMAINING		24.48 – 23.48	24.48 – 23.48
CONTROL COST:	$7,950 PER TON NO_X REDUCED		
IMPLEMENTING AGENCY:	SCAQMD		

*The lower end of the emission reduction range will be committed in the SIP as a contingency measure.

DESCRIPTION OF SOURCE CATEGORY

There were approximately 284 facilities in the Regional Clean Air Incentives Market (RECLAIM) program, as of July 1, 2010. The RECLAIM program includes facilities with NOx or SOx emissions greater than or equal to four tons per year in 1990 or any subsequent year. A wide range of equipment such as fluid catalytic cracking units, boilers, heaters, furnaces, ovens, kilns, coke calciner, internal combustion engines, and turbines are major sources of NOx or SOx emissions at the RECLAIM facilities. This control measure identifies a series of control approaches that can be implemented to further reduce NOx emissions at the RECLAIM facilities.

Background

The RECLAIM program was first adopted in 1993 to further reduce emissions from the largest NOx and SOx emitting stationary sources by providing an alternative regulatory mechanism to the command and control regulatory structure. Under this program, facilities are issued NOx and SOx allocations, also known as RECLAIM Trading Credits (RTCs) or facility emission caps, which are declined annually. To meet the declining annual facility caps, RECLAIM facilities have the option of installing pollution control equipment, changing operations, or purchasing RTCs from the RECLAIM market.

The RECLAIM program is subject to several legal mandates. The Health and Safety Code requires the District to monitor the advancement in Best Available Control Retrofit Technology (BARCT), and if BARCT advances, the District is required to periodically re-

assess the overall facility caps, and reduce the RTC holdings, as if the equipment located at the facilities would be subject to applicable equivalent command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the basin attain the National Ambient Air Quality Standards (NAAQS) for ozone and $PM_{2.5}$ as expeditiously as practicable. The BARCT evaluation must include an evaluation of the maximum degree of reduction achievable with advanced control technologies taking into account the environmental, energy, and economic impacts for each class or category of source.

A review of the emissions profile of the RECLAIM universe shows that the NOx emissions are not evenly distributed among the RECLAIM facilities: the top 10% of the universe (24 facilities) comprised mainly of refineries, power plants, cement, glass, and steel manufacturing, emitted about 80% of the NOx emissions.

Regulatory History

On October 15, 1993, the AQMD's Governing Board adopted Regulation XX – RECLAIM. The RECLAIM program at its inception included 392 NOx facilities. RECLAIM Regulation XX includes 11 rules that specify the applicability, definitions, allocations, trading and operational requirements, as well as monitoring, reporting, and recordkeeping requirements. The NOx RECLAIM regulation has been revised several times, and one significant amendment (2005) reflected a BARCT re-assessment. The January 2005 amendment resulted in a NOx RTC reduction of 7.7 tons per day (tpd), approximately 22.5% reduction of the RTC holdings, which was implemented in 5 phases: 4 tpd by 2007 and an additional 0.925 tpd in each of the following 4 years.

PROPOSED METHOD OF CONTROL

The proposed Phase I reductions are designed to serve as a contingency measure. It will be implemented if the Basin does not attain the 24-hr PM2.5 standard by 2014.Currently there are approximately 8 tpd of excess RTC in the market. A shave of 2 tpd of NOx RTCs should not cause a significant impact to the market. RTCs were traded on average of $4 a pound for compliance year 2011. In an effort to further minimize the impact on the majority of the RECLAIM universe, staff will work with stakeholders to evaluate various shaving methodologies (e.g., sector-specific or across-the-board).

EMISSIONS REDUCTION

Phase I reductions target a range of 2-3 TPD NOx. During the rule development phase, staff may refine the emission reductions to include growth and other unforeseen issues. Phase I is expected to be adopted in 2013 and the shave will be implemented/triggered for compliance year 2015, if the attainment of 24-hr PM2.5 standard is not met by 2014. If not triggered in 2015, these reductions will be a part of the 3 – 5 TPD of NOx reductions for Phase II of CMB-01 and will be incorporated into the 2015 AQMP. Note that the California Health and Safety Code requires the District to monitor the advancement in Best Available Control Retrofit Technology (BARCT), and if BARCT advances, the District is required to

periodically re-assess the overall facility caps, and reduce the RTC holdings to applicable equivalent command-and-control BARCT levels.

According to the RECLAIM Annual Audit Reports, NOx emissions were reduced from 2008 to 2010, and the vast majority of the RECLAIM facilities complied with their RTC allocations. The audited annual NOx emissions for the entire RECLAIM universe were reported as 22.9, 20, and 19.5 tpd for compliance year 2008, 2009, and 2010, respectively. The NOx RTCs allocated for the universe were reported as 29.4, 28.4, and 27.5 tpd for compliance year 2008, 2009, and 2010, respectively. Data in the audit reports reflected an excess of 6.5, 8.4, and 8.0 tpd of RTCs holdings for compliance year 2008, 2009, and 2010, respectively, or approximately a 22–30% excess in RTC holdings in the most recent three years. Being cognizant that the 2008 emission profile may reflect a period of the economic downturn, the RTC reduction range of 2-3 tpd estimated by staff (approximately 25 - 38 percent of the unused RTC holdings) appears to be achievable.

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

It is expected that the cost effectiveness for this control measure would be in the neighborhood of $7950 per ton for Phase I based on the most recent RTC trading prices.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from RECLAIM facilities.

REFERENCES

AQMD, 2008. Rule 1146 – Emissions of Oxides of Nitrogen from Industrial and Commercial Boilers, Steam Generators, and Process Heaters, Amended September 5, 2008.

AQMD, 2010. Rule 1110.2 – Emission Reductions from Gaseous and Liquid Fueled Engines, Amended July 9, 2010.

AQMD, 2010-12. Annual RECLAIM Audit Report for 2008 Compliance Year, March 5, 2010; Annual RECLAIM Audit Report for 2009 Compliance Year, March 5, 2010; and Annual RECLAIM Audit Report for 2010 Compliance Year, March 2, 2012.

AQMD, 2012. Stationary Source Committee, Item #4, Twelve-month Rolling Price of 2010 and 2011 Compliance Years RTCs, April 20, 2012

Bay Area, 2006. Regulation 9, Rule 9 – NOx from Stationary Gas Turbines, Amended December 6, 2006.

EPA, Menu of Control Measures - Control Options for Reducing NOx from Point and Area Sources, September 3, 2010.

EPA, Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Petroleum Refining Industry, October 2010.

LBL, 2005. Energy Efficiency Improvement and Cost Saving Opportunities for Petroleum Refineries, Sponsored by the U.S. EPA, Ernest Orlando Lawrence Berkeley National Lab, February 2005.

SJVUAPCD, 2007. Rule 4703 – Stationary Gas Turbines, Amended September 20, 2007.

SJVUAPCD, 2008. Rule 4320 – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater Than 5 MMBTU/hr, Adopted October 16, 2008.

SJVUAPCD, 2011. Rule 4354 – Glass Melting Furnaces, Amended May 19, 2011.

SJVUAPCD, 2011. Rule 4702 – Internal Combustion Engines, Amended August 18, 2011.

BCM-01: FURTHER REDUCTIONS FROM RESIDENTIAL WOOD BURNING DEVICES [PM2.5]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	RESIDENTIAL WOOD COMBUSTION			
CONTROL METHODS:	BASIN-WIDE EPISODIC MANDATORY CURTAILMENT			
EMISSIONS (TONS/DAY):				
WINTER AVERAGE DAY	**2008**	**2014**	**2019**	**2023**
PM2.5 INVENTORY	10.6	9.4	9.4	9.4
PM2.5 REDUCTION*		7.1	7.1	7.1
PM2.5 REMAINING		2.3	2.3	2.3
CONTROL COST:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

* *Winter average day reduction based on episodic conditions and on 75% rule effectiveness.*

DESCRIPTION OF SOURCE CATEGORY

The purpose of this measure would be to seek further particulate matter (PM) emissions reductions from residential wood burning fireplaces and wood stoves whenever key areas in the South Coast Air Basin are forecast to approach the federal 24-hour PM2.5 standard.

Background

The types of devices used to burn wood in a typical residence are fireplaces and wood heaters (e.g., fireplace inserts and free-standing wood stoves). Since fireplaces are very inefficient heat sources, they are used primarily for aesthetic purposes. Fireplace inserts and wood stoves are much more efficient and in some residences, are used as the primary source of heating (U.S. EPA, 1996).

Pollutant emissions from residential wood burning devices are caused primarily by incomplete combustion and include PM, CO, NOx, SOx, and VOC. Particulate emissions, however, have been the focus of most state and local control programs for wood smoke. Studies indicate that the vast majority of particulate emissions from residential wood combustion are in the fine (2.5 micrometers or less) fraction (Naeher, 2007). Additionally, incomplete combustion of wood produces polycyclic organic matter (POM), a group of compounds classified as hazardous air pollutants under Title III of the federal Clean Air Act.

In 2011, the California Air Resources Board (CARB) conducted a Statewide evaluation of emissions from residential wood combustion based on the most recent emission factors, activity data, and data (where available) from the American Housing Survey, U.S. Census Bureau (CARB, 2011). The results of the updated residential wood combustion emissions inventory,

including reductions from existing control programs (i.e., construction restrictions and curtailments), are factored into the baseline inventory provided in the summary table above.

Regulatory History

Control Measure #MSC-06 (Emission Reductions from Wood-Burning Fireplaces and Stoves) from the 2007 AQMP was implemented in March 2008 through adoption of AQMD Rule 445 - Wood Burning Devices (AQMD, 2008). Under the Rule provisions, only gaseous-fueled hearth devices are allowed in new developments. For existing residential and commercial developments, Rule 445 requires wood burning devices sold or installed in the Basin to be U.S. EPA Phase II-certified or equivalent. Rule 445 prohibits the burning of any product not intended for use as a fuel (e.g., trash) in a wood burning device and requires commercial firewood facilities to only sell seasoned firewood (20% or less moisture content) from July through February. Rule 445 also establishes a mandatory wood burning curtailment program that extends from November 1 through the end of February each winter season. During a wood burning curtailment period, the public is required to refrain from both indoor and outdoor solid fuel burning in specific areas where PM2.5 air quality is forecast to exceed 35 $\mu g/m^3$ (federal 24-hour standard).

In conjunction with the implementation of Rule 445, the District has conducted an incentive program for a discount off of the purchase and installation of a gaseous-fueled device to encourage non-wood burning alternatives. To date the program has resulted in nearly 10,000 installations throughout the Basin and is an ongoing program. In addition, the District is exploring a potential wood stove change-out incentive program whereby certain residences will be offered an incentive to replace their older non-EPA certified wood stove or other non-certified wood burning appliance with an EPA certified wood stove. This will aid in emission reductions by providing a cleaner burning option to those who burn wood as their primary source of heat or otherwise do not have natural gas service for a centralized heating system. These residences are currently exempt from the AQMD Rule 445 residential wood burning curtailment.

PROPOSED METHOD OF CONTROL

Wood smoke reduction programs have been implemented in other jurisdictions for many years. The stringency of each air district's program depends on the region's PM air quality and the relative contribution of wood smoke to ambient fine particulate. While it is acknowledged the overall contribution of residential wood smoke to regional particulate pollution is relatively small (<10%) in the South Coast Basin, its significance can be greater on an episodic basis in the winter months. The severity of the region's PM air quality problem has necessitated a review of wood smoke reduction programs to determine if additional, cost-effective emissions reductions can be achieved.

A review of other California air district regulations and modeling sensitivity analyses have indicated that further reductions in residential wood burning during high PM2.5 days would be an effective way to achieve attainment early. It is recommended that the current mandatory wood burning curtailment threshold be lowered from 35 $\mu g/m^3$ to a more conservative 30 $\mu g/m^3$. This threshold is used in two other California air districts' wood smoke reduction programs (Sacramento Metropolitan AQMD, 2009; San Joaquin Valley APCD, 2008), and

would provide for a margin of safety given the uncertainties in the air quality forecasts. In addition to the existing sub-regional curtailment program of Rule 445 (based on areas forecast to exceed the existing PM2.5 standard), this measure would implement a curtailment that would apply Basin-wide whenever a PM2.5 level of greater than 30 $\mu g/m^3$ is forecast at any monitoring station which has recorded violations of the design value for the current PM2.5 24-hour standard of 35 $\mu g/m^3$ for either of the two previous three-year design value periods. The design value is the 3-year average of the annual 98^{th} percentile of the 24-hour average values of monitored ambient PM2.5 data. For example, for a 2014 implementation year, the three-year average design value would be based on the average of the 98^{th} percentile of ambient PM2.5 monitoring for years 2011 through 2013. Therefore, in 2014 under this criteria, either the 2014 (2011-2013) or a 2013 (2010-2012) design value above 35 $\mu g/m^3$ at any monitoring station would lead to Basin-wide curtailment if a 30 $\mu g/m^3$ or greater is forecast there. Mira Loma is the only monitoring station that is projected to trigger this Basin-wide curtailment. Current exemptions (e.g., high elevation, sole source of heat, etc.) in Rule 445 will be maintained under this measure. Based on current air quality data, it is expected that there could be up to 20 such curtailment days. It should be noted that, as with the current mandatory program, the Basin-wide curtailment criteria will apply for the entire winter season, which is November through February. Under this measure, consideration will also be given to expanding the defined winter season to potentially include October and/or March.

Key to the success of the control measure is a high level of rule compliance, including consideration of the exemptions provided in Rule 445, such as low-income households, wood burning as the sole source of heat, and a lack of natural gas service. During development of Rule 445 in 2008 AQMD staff reviewed the emissions reduction methodologies for existing wood burning curtailment programs in the San Joaquin Valley and for Sacramento Metropolitan AQMD. The San Joaquin Valley methodology presumed an 80 percent compliance rate while Sacramento Metropolitan presumed a 78 percent compliance rate. Recognizing that the Rule 445 curtailment program contained similar exemptions (e.g., sole source of heat) as the other air district's regulations, a compliance rate of 75 percent was assumed for Rule 445 emissions reductions. Subsequent to adoption of AQMD Rule 445, survey work has been conducted to evaluate the public's knowledge of mandatory wood burning curtailment programs in other California air districts. For the San Joaquin Valley a 2010 survey indicated 83 percent of respondents were aware of the mandatory wood burning curtailment program and a 2009 Sacramento survey documented 92 percent respondent awareness. In the Bay Area, a 2012 survey showed that 75 percent of residents support the no-burn policy and 89 percent stated that they would not burn wood even if a no-burn day was not forecasted for a holiday. Given this information and the fact that the Rule 445 mandatory curtailment notification system is at least equivalent to programs throughout the State, AQMD staff believes that the 75 percent rule effectiveness assumption for this control measure continues to be reasonable.

In order to complement this measure, staff will seek continuation and enhancement of the District's gas log buy-down incentive program

EMISSIONS REDUCTION

Based on historical data from 2009 to 2011, it is estimated that decreasing the existing Rule 445 curtailment threshold from 35 to 30 $\mu g/m^3$ could result in an approximate 50% increase in the

number of no-burn days (approximately 20 days total) during the November through February winter season. Lowering the wood burning curtailment threshold and applying the curtailment to the entire Basin when triggered could potentially reduce Basin-wide ambient PM2.5 concentrations on these episodic no-burn days by about 7.1 tons per winter day (assuming 75% rule effectiveness).

It should be noted that while controlling emissions from residential wood burning is primarily intended to reduce PM2.5 emissions, there is an added benefit of also reducing emissions of CO, VOC, NOx, SOx, and hazardous air pollutants.

RULE COMPLIANCE AND TEST METHODS

Rule compliance is monitored by AQMD compliance staff on no-burn days in the affected areas. A compliance program has been developed for existing Rule 445, including outreach and education, enhanced surveillance and a progressive warning and fine scheme for violators. Lowering the wood-burning curtailment threshold would represent an increase in no-burn days that are currently monitored by AQMD compliance staff under the current Rule 445 "Check Before You Burn" program. As the program would be expanded to Basin-wide, additional compliance resources may need to be reallocated during no-burn days. A 75% rule effectiveness for this source category is assumed, which accounts for both rule exemptions (i.e. if wood combustion is used as the primary heating source) and expected rule compliance rates.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not been determined. Increasing the number of curtailment days would result in relatively few cost increases to the impacted community. The costs for the district to implement outreach and potentially an incentive program would be approximately $500,000 beyond current Rule 445 implementation. 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 emissions from residential wood combustion sources.

REFERENCES

AQMD, 2008. South Coast Air Quality Management District; AQMD Governing Board Item 37: Draft Final Staff Report for Proposed Rule 445 – Wood Burning Devices; March 7, 2008. http://www.aqmd.gov/hb/2008/March/080337a.html

CARB, 2011. California Air Resources Board; Area Source Methodology, Section 7.1 Residential Wood Combustion; March 2011.

Naeher, 2007. Woodsmoke Health Effects: A Review, Journal of Inhalation Toxicology, 19:67-107, 2007

Sacramento Metropolitan AQMD, 2009. Sacramento Metropolitan Air Quality Management District; Rule 421 – Mandatory Episodic Curtailment of Wood and Other Solid Fuel Burning; September 2009. http://airquality.org/rules/rule421.pdf

San Joaquin Valley APCD, 2008. San Joaquin Valley Air Pollution Control District Rule 4901 – Wood Burning Fireplaces and Wood Burning Heaters; October, 2008. http://www.valleyair.org/rules/currntrules/r4901.pdf

U.S. EPA, 1996. U.S. Environmental Protection Agency AP-42, Section 1.9, Residential Fireplaces; October 1996.

U.S. EPA, 1996. U.S. Environmental Protection Agency AP-42, Section 1.10, Residential Wood Stoves; October 1996.

BCM-02: FURTHER REDUCTIONS FROM OPEN BURNING [PM2.5]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	OPEN BURNING			
CONTROL METHODS:	BASIN-WIDE EPISODIC RESTRICTIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
PM2.5 INVENTORY	2.2	4.6	4.6	4.6
PM2.5 REDUCTION*		4.6	4.6	4.6
PM2.5 REMAINING		0	0	0
CONTROL COST:	TBD			
IMPLEMENTING AGENCY:	SCAQMD			

** Reduction based on episodic implementation. Overall annual average emissions will remain unchanged as open burning will shift to non-episodic days.*

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 in one or more of the defined source/receptor areas. 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.

The rule establishes 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.

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. It was again amended in November 2008 to implement 2007 AQMP Control Measure BCM-04.

PROPOSED METHOD OF CONTROL

The restriction for no burn days is based on a PM2.5 daily forecast. Rule 444 currently contains requirements that a no-burn day may be called under a combination of geographical, meteorological, and air quality conditions. This control measure would potentially increase the number of no-burn days by lowering the air quality forecast threshold. This measure would implement a curtailment that would apply Basin-wide whenever a PM2.5 level of greater than 30 $\mu g/m^3$ is forecast at any monitoring station which has recorded violations of the design value for the current PM2.5 24-hour standard of 35 $\mu g/m^3$ for either of the two previous three-year design value periods. The design value is the 3-year average of the annual 98^{th} percentile of the 24-hour average values of monitored data ambient PM2.5 data. For example, for a 2014 implementation year, the three-year average design value would be based on the average of the 98^{th} percentile of ambient PM2.5 monitoring for years 2011 through 2013. Therefore, in 2014 under this criteria, either the 2014 (2011-2013) or a 2013 (2010-2012) design value above 35 $\mu g/m^3$ at a monitoring station would lead to Basin-wide curtailment if a 30 $\mu g/m^3$ or greater is forecast there. As with Control Measure BCM-01, the burn restriction criteria will apply for the entire winter season, which is November through February. Consideration will also be given to expanding the defined winter season to potentially include October and/or March.

For this measure, the rule effectiveness is assumed to be 100% as the open burning activities will be shifted to other permissible burn days, and the full participation of effected entities under the current Rule 444 curtailment program. This measure will also seek to determine economically and technologically feasible alternatives to burning.

EMISSIONS REDUCTION

Enhancing the open burning restrictions with this revised threshold criteria and applying a curtailment to the entire Basin could potentially reduce Basin-wide ambient PM2.5 concentrations on these episodic no-burn days by about 4.6 tons per winter day. Since the burning would likely be shifted to other days, the total annual emissions would remain the same, but would not occur on days where high PM2.5 levels are forecast.

RULE COMPLIANCE

The measure will be implemented through the existing burn authorization process and field inspectors to ensure rule compliance.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not been determined. Increasing the number of curtailment days would result in changes in operations. The District will continue to analyze the potential cost impacts associated with this measure during rulemaking.

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
Rule 444 – Open Burning, Governing Board package, Amended November 2008.

BCM-03: FURTHER PM REDUCTIONS FROM UNDER-FIRED CHARBROILERS

[PM2.5]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	UNDER-FIRED CHARBOILERS			
CONTROL METHODS:	ADD-ON CONTROL EQUIPMENT WITH VENTILATION HOOD REQUIREMENTS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
PM2.5 INVENTORY	9.06	9.15	9.69	10.05
PM2.5 REDUCTION			1.0*	1.0*
PM2.5 REMAINING		9.15	8.69	9.05
CONTROL COST:	$15,000 PER TON REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

** Reductions will be submitted into the SIP once feasible controls are identified*.

DESCRIPTION OF SOURCE CATEGORY

This control measure is carried over from the 2007 AQMP/SIP. Restaurant operations emit PM and VOCs. Both of these pollutants contribute to the region's exceedances of State and federal PM2.5 and ozone air quality standards.

Background

Restaurant operations include charbroilers (chain-driven and under-fired), griddles, deep fat fryers, ovens, and other equipment. Based on information from the 2007 AQMP, under-fired charbroilers are responsible for 84 percent of the PM emissions from this source category (2007, AQMD). The emissions summary table above presents PM2.5 emissions from under-fired charbroilers. The emission profile at the Mira Loma station showed a high concentration of organic carbon and cooking ranks as the top source category for directly emitted PM2.5 emissions.

Regulatory History

The 1997 AQMP included Control Measure PRC-03 - Emission Reductions from Restaurant Operations. AQMD Rule 1138, adopted in November 1997, implemented Phase I of this control measure, reducing 0.5 tons per day of PM10 emissions from chain-driven charbroilers.

The 1999 Amendment to the 1997 Ozone State Implementation Plan for the South Coast Air Basin included control measure PRC-03 – Emission Reductions from Restaurant Operations – Phase II, with a goal of reducing 0.9 tons per day VOC and 7.0 tons per day of PM10 (AQMD, 1999).

In August 2000, staff reported that cost-effective controls for under-fired charbroilers were limited and recommended substituting the remaining 0.9 tons/day of VOC emissions reductions assigned to this source category with reductions from another control measure (AQMD, 2000). However, because of the significant contribution of PM emissions from under-fired charbroilers 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 represented a conservative reduction from a baseline of approximately 10 tons per day as cost-effective controls for the majority of under-fired charbroilers had not yet been developed.

A report to the Board was made in December 2004 recommending findings of infeasibility be made for control measure PRC-03, and substitute emission reductions from other adopted rules, as required by the 2003 AQMP (AQMD, 2004). AQMD staff also recommended funding for demonstration projects. In December 2004, 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 were received for this project.

The 2007 AQMP carried over a control measure intended to reduce emissions from under-fired charbroilers (AQMD, 2007). The 2007 control measure (#BCM-05) described Bay Area AQMD rule development efforts that identified use of electrostatic precipitators (ESP), high-efficiency particulate arresting (HEPA) filters, wet scrubbers, and thermal oxidizers at high-volume restaurants with under-fired charbroilers.

In 2008-2009, staff reinitiated rule development for restaurants with under-fired charbroilers and held a series of working group meetings and a Public Workshop (AQMD, 2009). Due to lack of demonstrable cost-effective and affordable control technologies: however, AQMD staff determined rule adoption at that time was not feasible.

Control Technology Research

In 2011, AQMD staff requested an amendment to an existing University of California at Riverside – Center for Environmental Research and Technology (CE-CERT) contract to re-establish a test kitchen and test potential under-fired charbroiler control devices (AQMD, 2011). In October 2011, the Board approved an additional $216,000 for control device testing and authorized release of a Program Opportunity Notice (PON) to solicit proposals from control device vendors. As described in the PON, the District proposed to fund screening tests for up to three devices per manufacturer. Recognizing that any feasible control device must be affordable to the restaurant operator, one focus of the testing program was to evaluate potential control devices that have a capital and installation cost below $30,000 and annual operating costs below $10,000. It is intended that any control installation will not affect the cooking process; therefore the focus is for in-hood or rooftop/duct work placement of the device so as not to impact the taste or appearance of the charbroiled meat. Equipment showing promise in achieving desirable emission reduction rates during the screening tests would be tested using the full AQMD Test Protocol for Determining PM Emissions from Under-fired Charbroilers paid for by the District. An additional action was approved by the AQMD Governing Board in 2011 to develop a sole-source contract with CE-CERT, not to exceed $150,000, to provide a detailed speciation and toxicity analysis of emissions from under-fired charbroilers.

Five manufacturers responded to the PON with control technologies that include a catalytic oxidation device, filtration systems (one with activated charcoal), and a centrifuge system with an aerosol mist nebulizer. Under the PON process all submittals were subsequently reviewed by a technical evaluation panel comprised of AQMD staff and representatives from CE-CERT, Bay Area AQMD, and San Joaquin Valley APCD. The panel determined that all PON applications had technical merit and recommended that each manufacturer participate in the screening evaluations which began in May of 2012. Screening tests for other control devices are ongoing and full AQMD protocol testing will be initiated on control device technologies that pass the screening test.

PROPOSED METHOD OF CONTROL

Restaurant operations continue to be a significant contributor to the PM2.5 emission inventory. To date, a variety of control device technologies have been proposed for testing under the PON process. Results from these evaluations will guide future Rule development efforts. The following paragraph describes an under-fired charbroiler control program implemented by another California air district.

In 2007, the Bay Area AQMD adopted Regulation 6, Rule 2 for commercial cooking equipment (Bay Area AQMD, 2007). While this regulation mirrors the District's Rule 1138 requirements for chain driven charbroilers, it also contains control requirements for new and existing under-fired charbroilers with a facility-wide cooking surface of greater than or equal to 10 square feet. The rule exempts those operations cooking less than 800 lbs of beef per week. The regulation 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 ESPs, HEPA filters, wet scrubbers, and thermal oxidizers. The rule also requires ventilation hoods on new installations to meet standards of the Underwriters Laboratory (UL). There are currently several restaurants operating under-fired charbroilers which will be required to comply with the Bay Area AQMD's Rule in 2013. AQMD staff continues to evaluate the Bay Area AQMD's technical assessment and is monitoring rule implementation.

This control measure will be implemented in two phases. Phase I will be the completion of the technical assessment at CE-CERT, including considerations for compatibility with existing restaurants and all applicable building and safety codes (e.g. fire suppression). Evaluation of cost and affordability associated with the purchase, installation, and operation and maintenance (e.g., cleaning and/or replacing filters) of the equipment will also be assessed.

The findings from the control technology research currently being conducted will be the basis for potential future control requirements. Phase II will be the final technical and economic feasibility analysis in conjunction with potential rule development to establish requirements for under-fired charbroilers, if Phase I results suggest the feasibility of controls.

EMISSIONS REDUCTION

Control measure #BCM 05 - PM Emission Reductions from Under-Fired Charbroilers estimated that requiring large volume restaurants to install either ESP or HEPA control devices with at least 85 percent control could achieve a PM2.5 reduction of 1.1 tons per day from this source category (AQMD, 2007).

A subsequent review of potential emissions reductions was developed during preparation of the 2009 Proposed Amended Rule 1138 Preliminary Draft Staff Report (AQMD, 2009). This analysis was based on restaurant counts and activity data from a locally-developed survey (Rogozen, 1999) and PM emissions factors from a cooking device test report (CE-CERT, 1997). The Preliminary Draft Staff Report indicated potential emission reductions of filterable/condensable PM2.5 of 1.8 to 2.1 tons per day, based on an overall control efficiency of 85 percent, for restaurants cooking 1,250 pounds of hamburger per week. These potential emissions reductions, however, were determined to be infeasible due to a lack of affordable control technologies. Currently, several new control technologies are beginning to be demonstrated. If any of them turn out to be feasible, this measure will require emission reductions equivalent to the use of such technologies.

Emissions reductions specific to this control measure are unknown at this time, however, preliminary evaluation of control technologies indicates the potential to reduce PM2.5 emissions by approximately one ton per day from larger under-fired charbroiler operations. Any future rulemaking efforts would be based on technical and economic feasibility analysis as derived from the ongoing CE-CERT/AQMD research effort.

RULE COMPLIANCE AND TEST METHODS

Compliance requirements for this control measure would depend on the control strategy implemented. 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 and potential certification of charbroiler control devices. The test methods are used by qualified labs to certify the emissions level of specific control systems but have not been employed to test emissions at individual restaurants.

COST EFFECTIVENESS

The cost-effectiveness estimate associated with control measure implementation is preliminary at $15,000 per ton PM2.5 reduced and is based on the control technologies currently under evaluation. The District would analyze industry cost impacts as part of potential future Rule development.

IMPLEMENTING AGENCY

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

REFERENCES

AQMD, 1999. South Coast Air Quality Management District Final 1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin; December 2004. http://www.aqmd.gov/aqmp/Final_Amendment.pdf

AQMD, 2000. South Coast Air Quality Management District Status Report on Controlling Particulate Matter and Volatile Organic Compound Emissions from Restaurant Operations; August 18, 2000. http://www.aqmd.gov/hb/2000/000820a.html

AQMD, 2004. South Coast Air Quality Management District Report to the Governing Board December 2004 - Staff Recommendations Regarding Controlling Emissions from Restaurant Operations; December 3, 2004. http://www.aqmd.gov/hb/2004/041239a.html

AQMD, 2007. South Coast Air Quality Management District Final 2007 AQMP Appendix IV-A District's Stationary and Mobile Source Control Measures; June 2007. http://www.aqmd.gov/aqmp/07aqmp/aqmp/Appendix_IV-A.pdf

AQMD, 2009. South Coast Air Quality Management District Preliminary Draft Staff Report, Proposed Amended Rule 1138 – Control of Emission from Restaurant Operations; August 2009. http://www.aqmd.gov/rules/proposed/1138/PAR1138PDSR.pdf

AQMD, 2011. South Coast Air Quality Management District Request to the Governing Board to Designate Funds and Issue Program Opportunity Notice for Testing Control Equipment for PM Reductions from Under-fired Charbroilers and Execute a Contract for Speciation and Toxicity Analysis of Emissions from Under-fired Charbroilers; October 7, 2011. http://www.aqmd.gov/hb/attachments/2011-2015/2011Oct/2011-Oct7-014.pdf

Bay Area AQMD, 2007. Bay Area Air Quality Management District Staff Report, Regulation 6, Rule 2: Commercial Cooking Equipment; November 2007. http://hank.baaqmd.gov/pln/ruledev/6-2/0602_sr_110507.pdf

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BCM-04: FURTHER AMMONIA REDUCTIONS FROM LIVESTOCK WASTE [NH3]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	FRESH LIVESTOCK WASTE			
CONTROL METHODS:	EPISODIC APPLICATION OF ACIDIFICATION OF MANURE TO REDUCE AMMONIA EMISSIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
NH3 INVENTORY	12.4	11.0	7.7	5.7
NH3 REDUCTION		TBD*	TBD*	TBD*
POLLUTANT REMAINING		TBD	TBD	TBD
CONTROL COST:	TBD			
IMPLEMENTING AGENCY:	SCAQMD			

** TBD are reductions to be determined once the technical assessment is complete and the control approach are identified.*

DESCRIPTION OF SOURCE CATEGORY

The purpose of the control measure is to reduce ammonia emissions from livestock operations with emphasis on dairies.

Background

The SCAB is exceeding both State and federal health-based air quality standards for PM2.5 and is currently designated by the U.S. EPA as non-attainment area for PM2.5. The AQMD is required to attain the 24-hour PM2.5 standards by 2014-2019. Ammonia contributes to formation of PM2.5 and mixes with transport emissions, particularly to form aerosol ammonium nitrate and ammonium sulfate. Livestock waste produces appreciable amounts of ammonia emissions.

In 2008/2009, there were approximately 208,000 dairy cattle, 7.9 million poultry, and 5,500 swine in the South Coast Air Basin. In general, with existing regulatory (i.e., Proposition 2 – known as cage-free proposition that passed in 2008), economic, and product demand climate, the livestock industry in the South Coast jurisdiction is not considered a growth industry into the future. However, with findings from recent research that freshly excreted manure in the animal housing areas is the major source of ammonia emissions and each cow produces approximately 60 kg of manure daily, selection of effective measures to minimize ammonia emissions from fresh manure is the focus of this control measure.

Regulatory History

Rule 1133.2 – Emission Reductions from Co-Composting Operations which was adopted in 2003 requires existing and new co-composting (including manure composting) facilities to comply with proper composting and control in order to achieve a minimum of 70% and 80% VOC reductions, respectively, and similar reductions for ammonia.

The 2007 AQMP Control Measure MCS-05 - Emission Reductions from Livestock Waste sought additional emission reductions from confined animal facilities (CAFs), beyond those achieved by current Rules 223 and 1127. Control Measure MCS-05 suggested adding control requirements for swine operations to meet the objectives of California Senate Bill (SB) 700 – Agriculture & Air Quality Summary and Implementation. The control measure aimed to require more stringent controls (Class Two Mitigation Measures) for large CAFs, including core measures across the board, and lesser controls (Class One Mitigation Measures) for smaller CAFs not currently subject to Rule 223 by bringing them into the District permit system. The control measure also aimed to further expand the scope of Rule 1127 and its Best Management Practices based on anticipated results of on-going and future scientific research regarding manure management. Overall, MCS-05 estimated 20% emissions reduction from each of the dairy, poultry, and swine categories.

Currently, Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities requires a written Permit to Operate for all large CAFs, which are defined as facilities with (1): 1,000 or more milking cows; or 3,500 or more beef cattle; or 7,500 or more calves, heifers, or other cattle; or (2): 650,000 or more laying hens; or (3): 3,000 or more swine. In addition, the rule also requires these large facilities to submit and implement an emission mitigation plan which can be developed based on different classes of mitigation measures to mainly minimize VOC emissions from housing, feed operations, and manure handling.

Rule 1127 – Emission Reductions from Livestock Waste requires best management practices for dairies and specific requirements regarding manure removal, handling, and composting; however, the rule does not focus on fresh manure, which is one of the largest dairy sources of ammonia emissions.

In 2011, staff conducted the Technology Assessment that included a revised emissions inventory for all pollutants, including ammonia, to reflect new emission factors as well as current and future livestock animal headcounts which were higher than anticipated in the 2007 AQMP. Based on the revised emissions inventory, industry-level projections (i.e., mostly negative growth), and current regulatory requirements, staff recommended that Rule 1127 amendments not be pursued at that time. Staff also recommended that the 2014 VOC emission reduction shortfall be made up with excess VOC emission reductions generated from the implementation of Rule 1143 – Consumer Paint Thinners and Multi-Purpose Solvents. However, this category remains a significant source of ammonia emissions.

Emission Control Research

The acidifier sodium bisulfate (SBS) has been used to reduce pH and therefore bacterial level in dairy bedding, as well as to prevent environmental mastitis (a potentially fatal mammary gland infection) and calf respiratory stress. In California, SBS has been used by dairies in Tulare,

Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito, and Sacramento, mainly to prevent cow lameness and nuisance flies. It has also been used by dairies in Walla Walla, Columbia, and Whitman (Washington), Wallowa (Oregon), and Wisconsin.

SBS is a hygroscopic acid salt and is an effective ammonia-reducing agent for fresh manure. SBS dissociates into Na^+, H^+, and SO_4^{2-}upon application to the manure, bedding, or dry lot surface. H^+ reduces the pH and protonates ammonia, converting it to ammonium. The ammonium is then bound by sulfate to form ammonium sulfate, which is retained in the manure in its solid form. Theoretically, 100 lbs of SBS would bind 14 lbs NH_3.

Research indicates that most ammonia reduction from dairy slurry (up to 84%) occurred during the first day of SBS application and that ammonia emissions decreased with increasing levels of SBS application. However, after 24 hrs, the reduction rates decreased and by day 3, the reduction rates were no longer different between dosages. On the average, SBS application was able to achieve a 60% ammonia emissions reduction with a 0.375 kg/m^2 (76.8 lb/1,000 ft^2) SBS application rate. Other findings reveal that SBS most effectively reduced ammonia emissions from dairy corrals at either an application rate of 50 lbs/1,000 ft^2, 3 times/week, or 75 lbs/1,000 ft^2, 2 times/week.

Recent research findings also indicate the effectiveness of SBS in alcohol control (up to 61% methanol reduction and 58% ethanol reduction), as well as fly control (up to 99% reduction) and bacteria reduction (68%) in dairies, depending on the application rates.

Currently, there is no research regarding the effects of SBS on odors at dairies; however, since pH reduction inhibits bacterial decomposition of nitrogenous compounds in the manure, it is believed that odors would also be reduced.

There is no research on the effects of topical application of SBS on cow milk production. Currently, there is one publication indicating a 5% to 15% increase in milk yield (depending on the lactation stages) for cows on the SBS-treated silage (as silage additive) with no adverse effects on the cows' blood biochemistry.

SBS is safe to be used for water treatment. According to the published findings by EPA, SBS can be used as a disinfectant to prevent damage of the membrane used in reverse osmosis. SBS is certified by the NSF/ANSI for treating drinking water (chlorine removal, corrosion & scale control, and pH adjustment) and has been used in California, Pennsylvania, and Oregon. It has also been used to remediate high pH soil at a construction site in California. Although the Chino area has an on-going desalting project, as with other salt-containing products, the use of SBS should be carefully considered in areas that are sensitive to salts and/or with existing high salt loading in soil. Application at high rates could form nitrous oxide. In addition, SBS must be applied at 50 to 75 lbs/1,000 ft^2, 2 times per week to manure to maintain constant emission reductions as the substance loses its effectiveness over time.

PROPOSED METHOD OF CONTROL

Reducing pH level in manure through the application of acidulant additives (acidifier) is one of the potential mitigations for ammonia. SBS is being considered for use in animal housing areas where high concentrations of fresh manure are located. Research indicates best results with the use of SBS on "hot spots". SBS can also be applied to manure stock piles and at fencelines, and upon scraping manure to reduce ammonia spiking from the leftover remnants of manure and urine. SBS application may be required seasonally or episodically during times when high ambient PM2.5 levels are of concern.

This control measure will be implemented in two phases. Phase I will be to conduct a technical assessment of the aforementioned method of control. The technical assessment will evaluate the application of SBS at local dairies so as to evaluate the direct technical and economic feasibility of application, including episodic application only. The technical assessment will also examine potential impacts to animal and worker health and safety associated with uses of SBS. Staff intends to work with stakeholders at the Regional Water Quality Control Board relative to potential ground water impacts from the land spreading of manure treated with SBS.

If deemed feasible and effective, Phase II would implement the measure as needed to address future PM2.5 standards. Rule requirements would be specific to dairies in the AQMD jurisdiction and may be unique to localized operations only. As such, the requirements may not be applicable to dairies elsewhere where a site-specific assessment would need to be made relative to those particular conditions. Each air district will likely need to conduct their own assessment as to the feasibility of SBS application in their jurisdiction.

EMISSIONS REDUCTION

The emission reductions associated with SBS application are unknown at this time. Based on historical data, application may only be required for 8 weeks out of the year. Research indicates emission reduction potential in the range of 60%; however, SBS application timing and manure coverage variables require further consideration. Existing information regarding SBS application at dairies in the South Coast Air Basin, and indicates an overall emission reduction potential of about 50%. Current use of SBS and application coverage volume and rates, along with cost, will be examined in conjunction with the above referenced Phase I pilot program and assessment.

RULE COMPLIANCE AND TEST METHODS

TBD

COST EFFECTIVENESS

SBS can be applied by hand application or by tractor-driven fertilizer spreader; therefore, the operating costs would be minimal.

For dairies, SBS application at 50 to 75 lbs/1,000 ft^2, 2 times per week would cost $33 to $49.50/1,000 ft^2/week. For treatment of heavy-traffic areas only, the estimated cost would be $2.48 to $3.71/cow/week (assuming 4 cows/1,000 ft^2).

Costs to livestock facilities could be less when accounting for the fact that many dairies may already be using SBS for other purposes. If dairy operators already have the application equipment and only need to increase the amount and/or frequency of SBS application, they may already be seeing some potential co-benefits of increased milk yield and healthier animals. As discussed under Emission Reductions above, due to the unknown frequency of episodic applications, exact cost per facility or cost-effectiveness will vary by year.

IMPLEMENTING AGENCY

The District has the authority to regulate ammonia emissions from livestock waste.

REFERENCES

Rule 1133.2 – Emission Reductions from Co-Composting Operations, AQMD, January 2003

Rule 1127 – Emission Reductions from Livestock Waste, AQMD, August 2004

Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities, AQMD, June 2006

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Contact with Mr. Chris O'Brien of Jones-Hamilton Co.

Contact with Mr. Edward Kashak of California Regional Water Quality Control Board, Santa Ana Region

IND-01: BACKSTOP MEASURE FOR INDIRECT SOURCES OF EMISSIONS FROM PORTS AND PORT-RELATED FACILITIES [NO_x, SO_x, PM2.5]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: IF THE BACKSTOP MEASURE BECOMES EFFECTIVE (I.E. IF EMISSIONS FROM PORT-RELATED SOURCES EXCEED TARGETS FOR NOX, SOX, AND PM2.5), AFFECTED SOURCES WOULD BE PROPOSED BY THE PORTS AND COULD INCLUDE SOME OR ALL PORT-RELATED SOURCES (TRUCKS, CARGO HANDLING EQUIPMENT, HARBOR CRAFT, MARINE VESSELS, LOCOMOTIVES, AND STATIONARY EQUIPMENT), TO THE EXTENT COST EFFECTIVE STRATEGIES ARE AVAILABLE

CONTROL METHODS: IF THE BACKSTOP MEASURE BECOMES EFFECTIVE, EMISSION REDUCTION METHODS WOULD BE PROPOSED BY THE PORTS AND POTENTIALLY COULD INCLUDE CLEAN TECHNOLOGY FUNDING PROGRAMS, LEASE PROVISIONS, PORT TARIFFS, OR INCENTIVES/DISINCENTIVES TO IMPLEMENT MEASURES, TO THE EXTENT COST EFFECTIVE AND FEASIBLE STRATEGIES ARE AVAILABLE

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
NOX INVENTORY*	78.6	51.2	47.2	39.2
NOX REDUCTION*		N/A	N/A	N/A
NOX REMAINING*		51.2	47.2	39.2
SOX INVENTORY*	25.5	1.8	2.3	2.7
SOX REDUCTION*		N/A	N/A	N/A
SOX REMAINING*		1.8	2.3	2.7
PM2.5 INVENTORY*	3.7	1.0	1.0	1.1
PM2.5 REDUCTION*		N/A	N/A	N/A
PM2.5 REMAINING*		1.0	1.0	1.1

CONTROL COST: TBD

IMPLEMENTING AGENCY: SCAQMD

** The purpose of this control measure is to ensure the emissions from port related sources are at or below the AQMP baseline inventories for PM2.5 attainment demonstration. The emissions presented herein were used for attainment demonstration of the 24-hr PM 2.5 standard by 2014.*

DESCRIPTION OF SOURCE CATEGORY

This control measure is carried over from the 2007 AQMP/SIP. If the backstop measure goes into effect, affected sources would be proposed by the ports and could include some or all port-related sources (trucks, cargo handling equipment, harbor craft, marine vessels, locomotives, and stationary equipment), to the extent cost effective and feasible strategies are available.

Other sources – i.e. sources that are unrelated to the ports – would not in any way be subject to emission reductions under this measure (including through funding of emission reduction measures, or purchase of emission credits, by the ports or port tenants).

Background

Emissions and Progress. 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 source of air pollution in Southern California. Emissions from port-related sources have been reduced significantly since 2006 through efforts by the ports and a wide range of stakeholders. In large part, these emission reductions have resulted from programs developed and implemented by the ports in collaboration with port tenants, marine carriers, trucking interests and railroads. Regulatory agencies, including EPA, CARB and SCAQMD, have participated in these collaborative efforts from the outset, and some measures adopted by the ports have led the way for adoption of analogous regulatory requirements that are now applicable statewide. These port measures include the Clean Truck Program and actions to deploy shore power and low emission cargo handling equipment. The Ports of Los Angeles and Long Beach have also established incentive programs which have not subsequently been adopted as regulations. These include incentives for routing of vessels meeting IMO Tier 2 and 3 NOx standards, and vessel speed reduction. In addition, the ports are, in collaboration with the regulatory agencies, implementing an ambitious Technology Advancement Program to develop and deploy clean technologies of the future.

Port sources such as marine vessels, locomotives, trucks, harbor craft and cargo handling equipment, continue to be among the largest sources of $PM_{2.5}$ and $PM_{2.5}$ precursors in the region. Given the large magnitude of emissions from port-related sources, the substantial efforts described above play a critical part in the ability of the South Coast Air Basin to attain the national $PM_{2.5}$ ambient air standard by federal deadlines. This measure provides assurance that emissions from the Basin's largest fixed emission source will continue to support attainment of the federal 24-hour PM2.5 standard. . Reductions in PM2.5 emissions will also reduce cancer risks from diesel particulate matter.

Clean Air Action Plan. The emission control efforts described above largely began in 2006 when the Ports of Los Angeles and Long Beach, with the participation and cooperation of the staff of the SCAQMD, CARB, and U.S. EPA, adopted the San Pedro Bay Ports Clean Air Action Plan (CAAP). The CAAP was further amended in 2010, updating many of the goals and implementation strategies to reduce air emissions and health risks associated with port

operations while allowing port development to continue. In addition to addressing health risks from port-related sources, the CAAP sought the reduction of criteria pollutant emissions to the levels that assure port-related sources decrease their "fair share" of regional emissions to enable the Basin to attain state and federal ambient air quality standards.

The CAAP focuses primarily on reducing diesel particulate matter (DPM), along with NOx and SOx. The CAAP includes proposed strategies on port-related sources that are implemented through new leases or Port-wide tariffs, Memoranda of Understanding (MOU), voluntary action, grants or incentive programs.

The goals set forth in the CAAP include:

- Health Risk Reduction Standard: 85% reduction in population-weighted cancer risk by 2020
- Emission Reduction Standards:
  - By 2014, reduce emissions by 72% for DPM, 22% for NOx, and 93% for SOx
  - By 2023, reduce emissions by 77% for DPM, 59% for NOx, and 93% for SOx

In addition to the CAAP, the Ports have completed annual inventories of port-related sources since 2005. These inventories have been completed in conjunction with a technical working group composed of the SCAQMD, CARB, and U.S. EPA. Based on the latest inventories, it is estimated that the emissions from port-related sources will meet the 2012 AQMP emission targets necessary for meeting the 24-hr PM2.5 ambient air quality standard. The projected emissions from port related sources are included in the "baseline" emissions assumed in this plan to attain the PM2.5 standards.

While many of the emission reduction targets in the CAAP result from implementation of federal and state regulations (either adopted prior to or after the CAAP), some are contingent upon the Ports taking and maintaining actions which are not required by air quality regulations. These actions include the Expanded Vessel Speed Reduction Incentive Program, lower emission switching locomotives,and incentives for lower emission marine vessels. This AQMP control measure is designed to provide a "backstop" to the Ports' actions to provide assurance that, if emissions do not continue to meet projections, the ports will develop and implement plans to get back on track, to the extent that cost effective and feasible strategies are available. .

Regulatory History

The CAAP sets out the emission control programs and plans that will help mitigate air quality impacts from port-related sources. The CAAP relies on a combination of regulatory requirements and voluntary control strategies which go beyond U.S. EPA or CARB requirements, or are implemented faster than regulatory rules. The regulations which the CAAP relies on include international, federal and state requirements controlling port-related sources such as marine vessels, harbor craft, cargo handling equipment, locomotives, and trucks.

The International Maritime Organization (IMO) MARPOL Annex VI, which came into force in May 2005, set new international NO_x emission limits on Category 3 (>30 liters per cylinder displacement) marine engines installed on new vessels retroactive to the year 2000. In October

~~2008, the IMO adopted an amendment which places a global limit on marine fuel sulfur content of 0.1 percent by 2015 for specific areas known as Emission Control Areas (ECA). The South Coast District waters of the California coast are included in an ECA and ships calling at the Port of Los Angeles and Long Beach have to meet this new fuel standard. In addition, the 2008 IMO amendment required new ships built after January 1, 2016 which will be used in an Emission Control Area (ECA) to meet a Tier III NOx emission standard which is 80 percent lower than the original emission standard.~~

~~To reduce emissions from switch and line-haul locomotives, the U.S. EPA in 2008 established a series of increasingly strict emission standards for new or remanufactured locomotive engines. The emission standards are implemented by "Tier" with Tier 0 as the least stringent and Tier 4 being the most stringent. U.S. EPA also established remanufacture standards for both line haul and switch engines. For Tiers 0, 1, and 2, the remanufacture standards are more stringent than the new manufacture standards for those engines for some pollutants.~~

~~To reduce emissions from on-road, heavy-duty diesel trucks, U.S. EPA established a series of cleaner emission standards for new engines, starting in 1988. The U.S. EPA promulgated the final and cleanest standards with the 2007 Heavy Duty Highway Rule. Starting with model year 2010, all new heavy-duty trucks have to meet the final emission standards specified in the rule.~~

~~On December 8, 2005, CARB approved the Regulation for Mobile Cargo-Handling Equipment (CHE) at Ports and Intermodal Rail Yards (Title 13, CCR, Section 2479), which is designed to use best available control technology (BACT) to reduce diesel PM and NO_X emissions from mobile cargo-handling equipment at ports and intermodal rail yards. The regulation became effective December 31, 2006. Since January 1, 2007, the regulation imposes emission performance standards on new and in-use terminal equipment that vary by equipment type.~~

~~In 1998, the railroads and CARB entered into an MOU to accelerate the introduction of Tier 2 locomotives into the SCAB. The MOU includes provisions for a fleet average in the SCAB, equivalent to U.S. EPA's Tier 2 locomotive standard by 2010. The MOU addressed NOx emissions from locomotives. Under the MOU, NOx levels from locomotives are reduced by 67 percent.~~

~~On June 30, 2005, Union Pacific Railroad (UP) and Burlington Northern Santa Fe Railroad (BNSF) entered into a Statewide Rail Yard Agreement to Reduce Diesel PM at California Rail Yards with the CARB. The railroads committed to implementing certain actions from rail operations throughout the state. In addition, the railroads prepared equipment inventories and conducted dispersion modeling for Diesel PM.~~

~~In December 2007, CARB adopted a regulation which applies to heavy-duty diesel trucks operating at California ports and intermodal rail yards. This regulation eventually will require all drayage trucks to meet 2007 on-road emission standards by 2014.~~

~~Areas where the CAAP went beyond existing regulatory requirements or accelerated the implementation of current IMO, U.S. EPA, or CARB rules include emissions reductions from ocean-going vessels through lowering vessel speeds, accelerating the introduction of 2007/2010 on-road heavy-duty drayage trucks, maximizing the use of shore-side power for ocean-going~~

vessels while at berth, early use of low-sulfur fuel in ocean-going vessels, and the restriction of high-emitting locomotives on port property. Each of these strategies is highlighted below.

HDV1 – Performance Standards for On-Road Heavy Duty Vehicles (Clean Truck Program) – This control measure requires that all on-road trucks entering the ports comply with the Clean Truck Program. Several milestones occurred early in the program implementation, but the current requirement bans all trucks not meeting the 2007 on-road heavy-duty truck emission standards from port property. This program has the effect of accelerating the introduction of clean trucks sooner than would have occurred under the state-wide drayage truck regulation framework.

OGV1 – Vessel Speed Reduction Program (VSRP): Under this voluntary program, the Port requested that ships coming into the Ports reduce their speed to 12 knots or less within 20nm of the Point Fermin Lighthouse. The program started in May 2001. The Ports expanded the program out to 40 nm from the Point Fermin Lighthouse in 2010.

OGV3/OGV4 – Low Sulfur Fuel for Auxiliary and Main Engines and Auxiliary Boilers: OGV3 reduces emissions for auxiliary engines and auxiliary boilers of OGVs during their approach and departure from the ports, including hoteling, by switching to MGO or MDO with a fuel sulfur content of 0.2 percent or less within 40 nm from Point Fermin. OGV4 Control measure reduces emissions from main engines during their approach and departure from the ports. OGV3 and OVV4 are implemented as terminal leases are renewed.

RL-3 – New and Redeveloped Near-Dock Rail Yards: The Ports have committed to support the goal of accelerating the natural turnover of line-haul locomotive fleet to at least 95 percent Tier 4 by 2020. In addition, this control measure establishes the minimum standard goal that the Class 1 (UP and BNSF) locomotive fleet associated with new and redeveloped near-dock rail yards use 15-minute idle restrictors and ULSD or alternative fuels, and as part of the environmental review process for upcoming rail projects, 40% of line-haul locomotives accessing port property will meet a Tier 3 emission standard and 50% will meet Tier 4.

PROPOSED METHOD OF CONTROL

The goal of this measure is to ensure that NOx, SOx and PM2.5 emissions reductions from port-related sources are sufficient to attain the 24-hr federal PM2.5 ambient air quality standard. This measure would establish targets for NOx, SOx, and PM2.5 for 2014 that are based on emission reductions resulting from adopted rules and other measures such as railroad MOUs and vessel speed reduction that have been adopted and are being implemented. These emissions from port related sources are included in the "baseline" emissions assumed in this plan to attain the 24-hour $PM_{2.5}$ standard. Based on current and future emission inventory projections these rules and measures will be sufficient to achieve attainment of the 24-hr federal PM2.5 ambient air quality standard. Requirements adopted pursuant to this measure will become effective only if emission levels exceed the above targets. Once triggered, the ports will be required to develop and implement a plan to reduce emissions from port related sources to meet the emission targets over a time period. The time period to achieve and maintain emission targets will be established pursuant to procedures and criteria developed during rulemaking and specified in the rule.

This control measure will be implemented through a District rule. Through the rule development process the AQMD staff will establish a working group, hold a series of working group meetings, and hold public workshops. The purpose of the rule development process is to allow the AQMD staff to work with a variety of stakeholders such as the Ports, potentially affected industries, other agencies, and environmental and community groups. The rule development process will discuss the terms of the proposed backstop rule and, through an iterative public process, develop proposed rule language. In addition, the emissions inventory and targets will be reviewed and may be refined if necessary. This control measure applies to the Port of Los Angeles and the Port of Long Beach, acting through their respective Boards of Harbor Commissioners. The ports may have the option to comply separately or jointly with provisions of the backstop rule.

Elements of Backstop Rule

Summary: This control measure will establish enforceable nonattainment pollutant emission reduction targets for the ports in order to ensure implementation of the 24-hr PM2.5 attainment strategy in the 2012 AQMP. The "backstop" rule will go into effect if aggregate emissions from port-related sources exceed specified emissions targets. If emissions do not exceed such targets, the ports will have no control obligations under this control measure.

Emissions Targets: The emissions inventories projected for the port-related sources in the 2012 AQMP are an integral part of the 24-hr PM2.5 attainment demonstration for 2014 and its maintenance of attainment in subsequent years. These emissions serve as emission targets for meeting the 24-hr PM2.5 standard.

Scope of Emissions 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. This measure will make use of the Port's annual emission inventory, either jointly or individually, as the basis for the emission targets. The inventory methodology to estimate these emissions is consistent with the CAAP methodology. Other sources – i.e. sources that are unrelated to the ports – would not in any way be subject to emission reductions under this measure (including through funding of emission reduction measures, or purchase of emission credits, by the ports or port tenants).

Circumstances Causing Backstop Rule Regulatory Requirements to Come Into Effect: The "backstop" requirements will be triggered if the reported aggregate emissions for 2014 for all port-related sources exceed the 2014 emissions targets. The rule may also provide that it will come into effect if the target is met in 2014 but exceeded in a subsequent year. If the target is not exceeded, the ports would have no obligations under this measure.

Requirements if Backstop Rule Goes Into Effect: If the "backstop" rule goes into effect, the Ports would submit an Emission Control Plan to the District. The plan would include measures sufficient to bring the Ports back into compliance with the 2014 emission targets. The Ports may choose which sources would be subject to additional emission controls, and may choose any number of implementation tools that can achieve the necessary reduction. These may include clean technology funding programs, lease provisions, port tariffs, or incentives/disincentives to

implement measures. As described below, the ports would have no obligation under this measure to implement measures which are not cost-effective and feasible, or where the ports lack the authority to adopt an implementation mechanism. The District would approve the plan if it met the requirements of the rule.

RULE COMPLIANCE AND TEST METHODS

Compliance with this control measure will depend on the type of control strategy implemented. Compliance will be verified through compliance plans, and enforced through submittal and review of records, reports, and emission inventories. Enforcement provisions will be discussed as part of the rule development process.

COST EFFECTIVENESS AND FEASIBILITY

The cost effectiveness of this measure will be based on the control option selected. A maximum cost-effectiveness threshold will be established for each pollutant during rule development. The rule will not require any additional control strategy to be implemented which exceeds the threshold, or which is not feasible. In addition, the rule would not require any strategy to be implemented if the ports lack authority to implement such strategy. If sufficient cost-effective and feasible measures with implementation authority are not available to achieve the emissions targets by the applicable date, the District will issue an extension of time to achieve the target. It is the District's intent that during such extension, the ports and regulatory agencies would work collaboratively to develop technologies and implementation mechanisms to achieve the target at the earliest date feasible.

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 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 & Safety 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 & Safety Code § 40440(b)(3)). The federal Court of Appeals has held that an indirect source rule is not a preempted "emission standard." *National Association of Home Builders v. San Joaquin Valley Unified Air Pollution Control District*, 627 F.3d. 730 (9th Cir. 2010)

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 & Safety 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 non-road 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 non-road 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 non-road 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 non-road equipment are not preempted by the 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 U.S. EPA.

REFERENCES

San Pedro Bay Ports Clean Air Action Plan, 2010 Update, October 2010

Southern California International Gateway Project Draft Environmental Impact Report, Port of Los Angeles, September 2011

SCAQMD, 2007 Air Quality Management Plan, Appendix IV-A, June 2007

EDU-01: FURTHER CRITERIA POLLUTANT REDUCTIONS FROM EDUCATION, OUTREACH, AND INCENTIVES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	RESIDENTIAL, COMMERCIAL, INDUSTRIAL, AND TRANSPORTATION SOURCES			
CONTROL METHODS:	INCREASED AWARENESS, INCENTIVE PROGRAMS, AND TECHNICAL ASSISTANCE IN MAKING LOW EMITTING PURCHASES, IMPLEMENTING EFFICIENCY PROJECTS, AND CONSERVATION TECHNIQUES.			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2008**	**2014**	**2019**	**2023**
POLLUTANT INVENTORY	N/A	N/A	N/A	N/A
POLLUTANT REDUCTION		N/A	N/A	N/A
POLLUTANT REMAINING		N/A	N/A	N/A
CONTROL COST:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

***** *Emissions inventory and reductions cannot be quantified due to the nature of the measure (e.g., outreach, incentive programs).*

DESCRIPTION OF SOURCE CATEGORY

This control measure is carried over from the 2007 AQMP/SIP.

Background

Energy efficiency and conservation have been included in the District's Air Quality Management Plans since 1991. The District continues to implement incentive and education programs to help promote clean air purchases, efficiency projects, and conservation techniques that provide criteria pollutant emissions benefits. The District has since adopted policies such as the Air Quality Related Energy Policy, Climate Change Policy, and Green Policy that help further define the District's efforts in these areas.

This measure seeks to increase awareness of the benefits of purchasing low emitting products and promote further implementation of efficiency and conservation projects**.** When making purchases such as new cars, yard equipment, or household products, there are several factors consumers consider, but emissions and health benefits are typically not considerations. To help make emissions an important factor in purchasers' decision-making process, the District has several existing outreach and education programs in place such as Clean Air Connections, Clean Air Choices, Air Quality Institute, educational materials, conferences, and outreach to specific communities throughout the District. Providing additional outreach and education regarding clean air choices will help consumers consider the emission benefits of their purchases. In some

instances, these purchases include efficiency gains that will decrease longer term operating costs, and thus provide a built-in financial incentive. Providing specific outreach and education on these potential cost savings will help increase penetration of such low emitting technologies and practices.

Furthermore, there are several existing incentive programs to help promote higher efficiency and lower emitting technologies such as the utility administered rebate programs for purchases of high efficiency appliances. Some of these existing programs are established for reasons other than emissions benefits. For instance, the electric utility rebate program was established to reduce electricity demand to help decrease the need for additional generation plants. However, this program also provides emission benefits that might be implemented faster with further education and outreach by the District.

The outreach and education regarding these existing programs will include information on co-benefits such as emission reductions and cost savings to promote accelerated implementation of these existing programs. The District will also offer additional incentive programs to complement existing programs or promote specific efficient low emitting technologies. For instance, the District's Lawn Mower Exchange program provides a good example of the significant impacts incentive programs can have. Over the past nine years over 43,000 gasoline lawnmowers have been exchanged for electric mowers.

The District will also help to promote potential efficiency benefits for existing equipment and structures. There are several reasons why many efficiency projects are not undertaken. In many instances tools, incentive programs, and loan programs for efficiency upgrades are not adequately described, advertised, or consolidated. Certain projects require high initial capital costs, despite relatively fast payback periods, which serves as a barrier to implementation. In addition, technical barriers prevent many system operators, home owners, and building maintenance crews from utilizing existing tools and implementing efficiency projects. The District will help develop technical outreach to residents and businesses to help implement projects that have emission benefits and short payback periods. The District may also examine ways to provide assistance through additional incentive programs and/or loan products to defray or amortize capital costs on certain efficiency projects.

Regulatory History

As this measure is not a regulatory item that will be implemented via rulemaking, there is no relevant regulatory history in this area. However, as mentioned above, the District has developed and implemented a wide array of education, outreach, technical assistance, and incentive programs designed to achieve emission reductions on a voluntary basis.

PROPOSED METHOD OF CONTROL

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with helping implement currently available incentive programs and developing additional incentive programs. Lastly the District may develop

programs to offer technical assistance to help implement efficiency measures and other low emission technologies.

EMISSIONS REDUCTION

Predicting emission reductions from these activities is not possible at this time. Outreach and education components will have benefits on emissions that can perhaps be quantified later based on program evaluation, technology penetration, and other assessment and inventory methods. Implementing additional incentive programs will provide a means to quantify these benefits as they are developed. Emission reductions achieved from these activities will be incorporated into the subsequent SIP revisions once projects are implemented.

RULE COMPLIANCE AND TEST METHODS

Not applicable.

COST EFFECTIVENESS

The cost effectiveness of this measure cannot be determined, given the variety of programs and projects that will be developed. The District will continually analyze costs associated for with education and outreach, and where possible quantify resulting emissions reductions. The cost effectiveness for specific incentive programs can be determined as they are developed and implemented by the District.

IMPLEMENTING AGENCY

The implementing agency will be the District, in cooperation with other local governments, agencies, technology manufacturers and distributors, and utility service providers.

REFERENCES

South Coast Air Quality Management District, AQMD Air Quality Related Energy Policy, Sept. 2011.

South Coast Air Quality Management District, AQMD Climate Change Policy, Sept. 2008.

South Coast Air Quality Management District, AQMD Green Policy, Oct, 2009.

National Academy of Sciences, Real Prospects for Energy Efficiency in the United States, 2010.

American Council for an Energy-Efficient Economy (ACEE), Energy-Efficiency: The Slip Switch to a New Track Toward Compliance with Federal Air Regulations, January 2012, Report # E122.

McKinsey and Co., Unlocking Energy Efficiency in the U.S. Economy, July 2009.

MCS-01: APPLICATION OF ALL FEASIBLE MEASURES ASSESSMENT [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ALL SOURCE CATEGORIES			
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2008**	**2014**	**2019**	**2023**
POLLUTANT INVENTORY	TBD	TBD	TBD	TBD
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
CONTROL COST*:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

***** *Emission reductions and cost-effectiveness will be determined after a source category and feasible controls are identified.*

DESCRIPTION OF SOURCE CATEGORY

Background

This control measure serves as a placeholder for any future control measures that may become feasible, prior to subsequent SIP revisions, through technology advances and/or cost decreases. The District continually monitors evolving control technologies, pricing changes, and the actions of other air quality agencies to determine the feasibility of implementing additional controls to achieve emissions reductions.

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). While this statute is not applicable to PM, the District believes it is appropriate and necessary to seek all feasible reductions from PM as well. 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." CARB guidance states that this definition, found in the CEQA Guidelines, applies to the requirements under air pollution laws. 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."

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 new retrofit control technology standards as technology develops.

PROPOSED METHOD OF CONTROL

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 a BARCT analysis with potential rule amendments if deemed feasible. In addition, the District will adopt and implement new retrofit technology control standards, based on research & development and other information, 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 that may become available in the future prior to subsequent Plan revisions.

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 the future set of "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

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

14 California Code of Regulations, Section 15364

Section 3

8-hour Ozone Measures

CTS-01: FURTHER VOC REDUCTIONS FROM ARCHITECTURAL COATINGS (RULE 1113) [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ARCHITECTURAL COATINGS			
CONTROL METHODS:	REDUCE THE VOC LIMITS FOR CERTAIN COATINGS TO 25 G/L, REMOVE OR FURTHER RESTRICT SMALL CONTAINER EXEMPTION, &/OR INCLUDE TRANSFER EFFICIENCY REQUIREMENTS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023 (2023-2007 SIP)***
VOC INVENTORY	21.9	15.5	16.2	16.7 (23.7)
VOC REDUCTION			2 - 4	2.1-4.1 (3.1- 6.2)
VOC REMAINING			12.2 - 14.2	12.6-14.6 (17.5 - 20.6)
CONTROL COST:	$10,000 TO $20,000 PER TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

* Emission reductions provided are based on the 2012 AQMP emissions inventory. Values provide in parenthesis are based on the 2007 SIP inventory projections for 2023.

DESCRIPTION OF SOURCE CATEGORY

The proposed control measure seeks to reduce the VOC emissions from large volume coating categories such as flat, non-flat and primer sealer undercoaters (PSU) and/or from the use of high-VOC architectural coatings sold in one liter containers or smaller. Additional emission reductions could be achieved from the application of architectural coatings by use of application techniques with greater transfer efficiency.

Background

Rule 1113 - Architectural Coatings, was originally adopted by the AQMD on September 2, 1977, to regulate the Volatile Organic Compound (VOC) emissions from the application of architectural coatings, and has since undergone numerous amendments. The last amendment, which was adopted on June 3, 2011, achieves 4.4 tons per day (tpd) emissions reduction by 2015.

Regulatory History

VOC Reductions

There have been several amendments to Rule 1113 which reduced the VOC limits for the high volume coating categories.

- November 8, 1996 – Flats Coatings were reduced from 250 g/L to an interim limit of 100 g/L effective July 1, 2001 and finally down to the current 50 g/L limit effective July 1, 2008.

- December 6, 2002

  - Non-Flat Coatings were reduced from 250 g/L to an interim limit of 150g/L effective January 1, 2003 and finally down to the current 50 g/L limit effective July 1, 2006.

  - PSU were reduced from 350 g/L to an interim limit of 200 g/L effective January 1, 2003 and finally down to the current 100g/L limit effective July 1, 2006.

Staff conducted technical assessments prior to each VOC limit reduction which demonstrated that the lower-VOC coatings performed as well as or better than the higher-VOC counterparts.

Small Container Exemption

The Small Container Exemption was adopted during the September 6, 1991 Rule 1113 amendment and allows manufacturers to sell coatings over the VOC limits in liter containers or smaller, provided they report those sales to the AQMD. Staff has been monitoring the use of the exemption and initially proposed phasing out the Small Container Exemption during the July 2011 rule amendment process. However, based on numerous comments and concerns, staff reconsidered the complete phase-out at that time and continues to study the issue.

Transfer Efficiency

Architectural coatings can be applied by brush, roller, sponge or trowel, that all achieve transfer efficiency greater than 90%. However, Rule 1113 – Architectural Coatings currently does not have a provision for transfer efficiency for spray application, as found in other coating rules focused on facility use. Another method used to reduce emissions from applying coatings is to improve the technique of the coating applicator. While HVLP and electrostatic paint spray application equipment can improve transfer efficiency up to a minimum of 65% when used properly, many painters hold the spray gun too close or too far away which also decreases transfer efficiency. A laser paint targeting system has been shown to improve transfer efficiency on average by 30% over equipment not using a targeting system, depending on the size, shape and configuration of the substrate (Iowa, 2010). Other retrofit technology is also available to increase transfer efficiency.

PROPOSED METHOD OF CONTROL

VOC Reductions

Staff will evaluate further reducing the VOC emissions from large volume coating categories such as flat, non-flat and primer sealer undercoaters (PSU), with consideration for appropriate implementation dates and potential creation of new subcategories (e.g., primers for metals) that retain current VOC limits. This approach may require inclusion of alternative test methods and approaches for measuring VOCs.

Small Container Exemption

Staff will evaluate various options for the Small Container Exemption, including a complete phase out of the exemption, creating certain new categories with higher VOC limits (e.g., primer for recycled rubber floor), creating a maximum allowable VOC limit, or phasing out the Small Container Exemption for certain coating categories.

Transfer Efficiency

Staff will evaluate the feasibility of a two-phase approach to achieve greater transfer efficiency from application of architectural coatings. The first phase will be to incorporate (retrofit by a certain date and incorporate into the design by a certain date) laser paint targeting or other available technology into spray guns. The second phase will be the inclusion of transfer efficiency provisions requiring that architectural coatings be applied by hand applications such as brush, roller, sponge, or trowel; or by High-Volume, Low-Pressure (HVLP) Spray or other technology capable of achieving a transfer efficiency equivalent or better to HVLP spray.

EMISSIONS REDUCTION

VOC Reductions

Staff estimated the VOC reduction based on the data that manufacturers reported under Rule 314 – Fees for Architectural Coatings for the 2008 calendar year, which does not include volume of coatings sold under the averaging compliance option, sell through or under the small container exemption. From the large volume categories, staff estimates baseline emissions and potential reductions to be 4.5 and up to 1.7 tpd, respectively.

Small Container Exemption

Depending on the approach implemented, there is the potential for reducing VOC emissions up to 1.9 tpd.

Transfer Efficiency

The first phase would incorporate the laser targeted technology, commercially proven to reduce coating usage by 30%. The second phase of incorporating transfer efficiency requirement of 65% may potentially reduce coating usage by up to an additional 30%. The emission reductions will primarily come from professional paint contractors who account for an estimated 65% of coating application and could result in VOC reductions up to 1 tpd.

RULE COMPLIANCE AND TEST METHODS

VOC Reductions

Rule compliance would be achieved by amending Rule 1113. In order to enforce the 25g/L VOC limit, Rule 1113 would have to include alternative VOC test methods to EPA Reference Method 24 for measuring VOCs in a reproducible and repeatable manner, especially for coatings with very low-VOC content. SCAQMD Method 313 *Determination of Volatile Organic Compounds (VOC) by Gas Chromatography* and/or ASTM Method D6886 *Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content*

Waterborne Air-Dry Coatings by Gas Chromatography are two alternatives currently available for inclusion into Rule 1113. These methods directly measure the VOC content of a coating yielding better precision for waterborne coatings than currently used methods.

In addition to the change in the test method, staff would also propose changing the metric that is used to regulate architectural coatings. The formula for the regulatory VOC, also referred to as the VOC of coating, removes the water and any exempt solvents in the VOC calculation. This calculation was hypothesized to prevent manufacturers from simply adding water to a coating to meet the VOC limit; therefore, requiring additional coats of paint to achieve the same coverage. Unfortunately, the calculation of the regulatory VOC magnifies any error in the VOC analysis, making the value unreliable especially for high-water, low-VOC coatings. Regulating coatings based on either the actual VOC, also referred to as the VOC of material, or the weight percent VOC would eliminate this source of error and allow for VOC limits less than 50g/L in the coatings rules. Further, staff does not believe that diluting waterborne coatings in order to achieve VOC compliance is a valid concern. Consumers have come to expect the type of coverage that today's coatings achieve; the marketplace will not accept coatings with poor coverage.

Small Container Exemption

Rule compliance would be achieved by amending Rule 1113.

Transfer Efficiency

Rule compliance would be achieved by amending Rule 1113 to require transfer efficiency requirements for spray applications.

COST EFFECTIVENESS

The cost-effectiveness of this control measure is estimated to be up to $20,000 per ton of VOC reduced. 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 the authority to regulate emissions from area sources.

REFERENCES

http://www.aqmd.gov/permit/spraytransferefficiency.html

http://iowaenviroassist.org/default/index.cfm/products/laserpaint/

http://www.gardco.com/pages/application/sq/laserpaint.cfm

CTS-02: FURTHER EMISSION REDUCTION FROM MISCELLANEOUS COATINGS, ADHESIVES, SOLVENTS AND LUBRICANTS [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	MISCELLANEOUS COATINGS, ADHESIVES, SOLVENTS AND LUBRICANTS			
CONTROL METHODS:	REDUCE THE ALLOWABLE VOC CONTENT IN PRODUCT FORMULATIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023 (2023 – 2007 SIP)***
VOC INVENTORY	14.1	11.5	13.5	14.5 (10.8)
VOC REDUCTION			1 - 2	1.1 – 2.2 (0.9 - 1.8)
VOC REMAINING	14.1	11.5	11.5 – 12.5	12.3 – 13.4 (9 - 9.9)
CONTROL COST:	$8,000 TO $12,000 PER TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

* Emission reductions provided are based on the 2012 AQMP emissions inventory. Values provide in parenthesis are based on the 2007 SIP inventory projections for 2023.

DESCRIPTION OF SOURCE CATEGORY

The proposed control measure seeks to reduce the VOC emissions from miscellaneous coatings, adhesive, solvent and lubricant categories by lowering certain product VOC limits. Examples of the miscellaneous categories to be considered include, but are not limited to, coatings used in aerospace; adhesives used in a variety of sealing applications; solvents for cleaning and preservation cleaning or graffiti abatement activities; fountain solutions for printing operations; and lubricants used as metalworking fluids to reduce heat and friction to prolong life of the tool, improve product quality and carry away debris.

Background

Over the years, the AQMD has developed numerous rules to reduce the Volatile Organic Compound (VOC) emissions from the use of coatings, adhesives, solvents and lubricants in commercial and industrial applications. Subsequent amendments to these rules achieved further VOC emission reductions primarily through product reformulations using low-VOC technologies including alternative resin chemistries, aqueous and bio-based products, and exempt solvents.

Regulatory History

The VOC rules that may be affected by this control measure are as follows:

- Rule 1124 – Aerospace Assembly and Component Manufacturing Operations
- Rule 1144 - Metalworking Fluids and Direct-Contact Lubricants
- Rule 1168 - Adhesive and Sealant Applications
- Rule 1171 - Solvent Cleaning Operations

PROPOSED METHOD OF CONTROL

Reductions would be achieved by lowering the VOC content of select few categories within the above-mentioned source-specific rules rather than relying on across the board lowering of VOC limits. For solvents, reductions could be achieved with the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. The proposal is anticipated to be accomplished with a multi-phase adoption and implementation schedule.

EMISSIONS REDUCTION

Current estimates are that there is a potential VOC emission reduction of about 1.0-2.0 tons per day.

RULE COMPLIANCE AND TEST METHODS

Rule compliance would be achieved by amending AQMD rules on coatings, adhesives, solvents and lubricants.

COST EFFECTIVENESS

The cost-effectiveness of this control measure is estimated at $8,000 to $12,000 per ton of VOC reduced.

IMPLEMENTING AGENCY

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

REFERENCES

Staff Reports

Material Safety Data Sheets

Product and Technical Data Sheets

CTS-03: FURTHER VOC REDUCTIONS FROM MOLD RELEASE PRODUCTS [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	FACILITIES/PROCESSES USING MOLDS (EXCLUDING AEROSPACE)			
CONTROL METHODS:	LIMITATION OF VOC CONTENT FOR MOLD RELEASE PRODUCTS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023 (2023-2007 SIP)***
VOC INVENTORY	2.3 - 3.6	2.4 - 3.8	2.7 - 4.2	3.0 - 4.7 (2.4)
VOC REDUCTION			0.6 - 2.0	0.8 - 2.2 (0.7)
VOC REMAINING			1.9 - 2.2	2.4 - 2.5 (1.7)
CONTROL COST:	$4,000 TO $8,000 PER TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

* Emission reductions provided are based on the 2012 AQMP emissions inventory. Values provide in parenthesis are based on the 2007 SIP inventory projections for 2023.

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce VOC emissions associated with the use of mold release products used in composite, fiberglass, metal and plastic manufacturing operations.

Background

Thousands of companies in the U.S. and California make metal, fiberglass, composite and plastic products. These products are often manufactured using molds which form the part into a particular configuration. Mold release agents are used to ensure that the parts, as they are made, can be released easily and quickly from the molds. Mold release agents are also used for concrete stamping operations to keep the mold from adhering to the fresh concrete. Mold release agents often contain waxes, silicone and lubricant compounds and many of them are blended with solvent carriers. The solvents used in the formulations are generally petroleum or other volatile organic compound (VOC) solvents and may also contain toxic components such as toluene and xylene. Mold cleaners may contain chlorinated solvents like trichloroethylene (TCE), petroleum solvents, n-methyl pyrollidone (NMP) and hexane.

Regulatory History

Mold release agents and cleaners are extensively used by a variety of different industrial sources. Residential and commercial concrete stamping is a rapidly growing industry, and overall VOC emissions are estimated to be significant. In some cases, particularly for mold

release agents used in fiberglass, non-aerospace composite manufacturing and concrete stamping, there are currently no regulations on the VOC content of these products. Aside from general facility toxicity restrictions, such as Rule 1402, there are no limits on the toxic components that can be used in these products. The few applications of these products that are regulated are often subject to outdated, high-VOC limitations that do not reflect the state of the technology. As a result, most of the current mold release agent product formulations are high-VOC, upwards of 600 g/L. However, alternative low-VOC formulations are available. The District regulates mold release agents in architectural coatings, specifically form release compounds. Those products have a current VOC limit of 250 g/L with the limit being lowered to 100 g/L effective in 2014. Similar water-based, bio-based and powder formulations are available for industrial applications, often at competitive pricing. The California Air Resources Board (CARB) currently surveys consumer product mold release sales volume, but does not regulate mold release coatings.

PROPOSED METHOD OF CONTROL

This control measure seeks to reduce emissions from mold release products on metal, fiberglass, composite and plastic products, as well as concrete stamping operations, by requiring the use of low-VOC mold release products that are currently available in the market.

EMISSIONS REDUCTION

The emissions inventory is estimated at 2.3 to 3.6 tons per day based on the 2011 Annual Emission Report data for fiberglass facilities and estimates for the concrete stamping industry. Requiring the use of low-VOC mold release products is estimated to result in emission reductions in the range of 0.8 to 2.0 tons per day.

RULE COMPLIANCE AND TEST METHODS

Compliance with this control measure would be achieved by similar compliance requirements under the existing Regulation XI rules.

COST EFFECTIVENESS

Based on data from similar types of aqueous and bio-based technologies, the cost effectiveness of this control measure is approximately $4,000 to $8,000 per ton of VOC reduced.

IMPLEMENTING AGENCY

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

REFERENCES

South Coast Air Quality Management District, "Final Staff Report For Proposed Amended Rule 1113 – Architectural Coatings," June, 2011 http://www.aqmd.gov/hb/attachments/2011-2015/2011Jun/2011-Jun3-024.pdf

CTS-04: FURTHER VOC REDUCTIONS FROM CONSUMER PRODUCTS [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	CONSUMER PRODUCTS			
CONTROL METHODS:	FURTHER STUDY OF LOW VAPOR PRESSURE SOLVENT CONTAINING PRODUCTS TO RE-EVALUATE THE EMISSION REDUCTIONS/AIR QUALITY BENEFITS; SUBSEQUENT ASSESSMENT OF COST-EFFECTIVE AND TECHNICALLY-FEASIBLE REDUCTIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
VOC INVENTORY	98	85	87	89
VOC REDUCTION*			TBD	TBD
VOC REMAINING			TBD	TBD
CONTROL COST:	LESS THAN $10,000 PER TON VOC REDUCED DEPENDING ON CONSUMER PRODUCT CATEGORY			
IMPLEMENTING AGENCY:	CARB/SCAQMD			

***** Reductions cannot be quantified due to the nature of the measure (e.g., multi-phase approach to reduce VOCs from consumer products).

DESCRIPTION OF SOURCE CATEGORY

According to California Air Resources Board (CARB) 2009 Almanac, consumer products will be the largest emission category for VOC by 2020. Consumer products are products used by institutional and household consumers and include such products as general purpose cleaners and degreasers, cosmetics, lawn and garden care products, detergents, adhesives, multipurpose lubricants, paint thinners and multipurpose solvents.

Background

The CARB Consumer Product Regulation exempts low vapor pressure volatile organic compounds (LVP-VOC) from counting towards the compliance obligation for consumer product VOC limits. LVP-VOCs are defined as products with a vapor pressure less than 0.1 mm Hg, a chemical compound with more than 12 carbon atoms, or having a boiling point greater than 216° C. The exemption was designed to specify the types of VOC compounds not subject to VOC limits (for example, surfactants, resins, and waxes). Certain solvents have also been introduced that qualify for the exemption. Recent testing conducted by the District on institutional cleaners found that traditionally formulated consumer products may contain significant amounts of LVP-VOC solvents. In some cases, such as certain multipurpose solvents, the products were 100 percent LVP-VOC solvents. Further testing indicated that some LVP-VOC solvents evaporate nearly as quickly as the traditional solvents they were meant to replace and have Maximum Incremental Reactivity (MIR) values well above the threshold considered to be non-reactive,

currently based on ethane. The study also shows that some LVP-VOCs are non-volatile and, for those that are non-volatile, an exemption is appropriate. Reformulation of products by substituting fast-evaporating LVP-VOC solvents for other solvents considered to be VOCs may not achieve the ozone reduction benefits anticipated by reducing the VOC content limits in the Consumer Product Regulation. In some categories, data suggest that use of LVP-VOC solvents has increased over time. Therefore, an evaluation of the continued need for use of LVP-VOC solvents in certain categories is warranted. District staff will work with CARB staff to identify categories where it may be appropriate to revise the LVP-VOC exemption. Staff will also work with CARB staff to review emission inventory data to ensure that the total organic emissions reflected in the inventory, in addition to VOC emissions, accurately capture VOC-exempt solvents and LVP-VOC emissions as well.

Regulatory History

CARB has the authority to regulate consumer products under Section 41712 of the Health and Safety Code (HSC). The District may regulate consumer products which CARB has not regulated.

PROPOSED METHOD OF CONTROL

Recent testing has shown that at ambient temperatures some LVP-VOC solvents readily evaporate. This subset of LVP-VOCs may be available to contribute to ozone formation. These findings indicate that further evaluation of consumer products formulated with LVP-VOCs is needed. Further research may be needed including identification of alternatives to LVP-VOCs and environmental chamber testing.

This measure will be developed in phases and begin with products that have greatest emission impacts, such as multi-purpose solvents, paint thinning products and institutional cleaners. Data are available for these products that indicate alternative formulations that do not rely on use of volatile or semi-volatile LVP-VOC are available.

In a subsequent phase, the control approach would revise the LVP-VOC exemption if speciated LVP-VOC survey data and research results show further VOC emissions reductions are needed. CARB and AQMD staff will work with stakeholders to identify cost-effective, technically-feasible controls from consumer product categories or others. Any proposed amendments to reduce VOC emissions would be vetted through a full public process.

EMISSIONS REDUCTION

Consumer products are expected to contribute over 89 tons per day of VOC emissions in the South Coast Basin by 2023. This inventory can be further refined by re-evaluating the TOG:VOC ratio included in the 2010 CARB inventory for Consumer Products for future ozone modeling purposes to better reflect ozone impacts from the use of consumer products. Further, as a part of the emissions inventory re-evaluation, current data are needed on sales and formulations of consumer products to determine the types and extent of LVP-VOC use and to identify categories where the LVP-VOC exemption may need revision..

RULE COMPLIANCE AND TEST METHODS

Revise the LVP-VOC exemption included in the CARB Consumer Product Regulation.

COST EFFECTIVENESS

Revisions to the LVP-VOC exemption would result in reformulation and other research and development costs for those manufacturers that have used LVP-VOC solvents to comply. However, most environmentally preferred consumer products contain little or no LVP-VOC solvents so no significant increase in cost is expected from this control measure. The estimated cost effectiveness figures are conservative estimates and likely overstate the actual costs. As an example, the City of Santa Monica reported spending 5% less on its cleaning products costs when it switched from conventional cleaners to less-toxic brands a decade ago.

IMPLEMENTING AGENCY

CARB has the authority to regulate emissions from consumer products and the District has the authority to regulate them where CARB has not done so.

REFERENCES

California Air Resources Board, CEPAM: External Adjustment Reporting Tool – Emission Projection by Summary Category, Accessed September 2012.

California Air Resources Board – Regulation for Reducing Emissions from Consumer Products, November 2010.

Vo, U. U., and Morris, M. "Non-Volatile, Semi-Volatile, or Volatile: Redefining Volatile for Volatile Organic Compounds", August 2012.

US Environmental Protection Agency, Environmentally Preferable Purchasing Program, The City of Santa Monica's Environmental Purchasing: A Case Study, EPA742-R-98-001, March 1998.

Green Seal, GS-37 Cleaning Products for Industrial and Institutional Use, http://www.greenseal.org/GreenBusiness/Standards.aspx?vid=ViewStandardDetail&cid=2&sid=23, accessed September 2012.

EcoLogo, CCD-146: Hard Surface Cleaners, http://www.ecologo.org/common/assets/criterias/ccd-146hardsurfacecleanersnov2010.pdf, accessed September 2012.

Fitz, D., Evaluation of Protocols for Measuring Mass Emissions from Cleaning of Application Equipment and Surfaces with Solvents, May 2011.

CMB-01: FURTHER NO_X REDUCTIONS FROM RECLAIM – PHASE II [NO_X]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	VARIOUS RECLAIM NO_X SOURCES			
CONTROL METHODS:	VARIOUS CONTROL TECHNOLOGIES AND METHODS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023 (2023-2007 SIP)****
NO_X INVENTORY	23.2	26.5	26.5	26.5 (26.5)
NO_X REDUCTION PHASE I*		2* - 3	2* - 3	2* - 3 (2* - 3)
NOX REDUCTION PHASE II				1 - 2 (1 - 2)
NO_X REMAINING		24.48 – 23.48	24.48 – 23.48	23.48 – 20.48 (21.5 -23.5)
CONTROL COST:	$ 16,000 PER TON NO_X REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

**Phase I is proposed as a contingency measure and if not triggered, the total targeted reductions targeted in Phase II will be a cumulative 3-5 tpd of NOx with the lower end of the emission reduction range to be committed in the SIP.*

*** Emission reductions provided are based on the 2012 AQMP emissions inventory. Values provided in parenthesis are based on the 2007 SIP emissions inventory projects for 2023. Emission reductions reflect RTC values and no adjustment between 2007 AQMP and 2012 AQMP is necessary.*

DESCRIPTION OF SOURCE CATEGORY

There were approximately 284 facilities in the Regional Clean Air Incentives Market (RECLAIM) program, as of July 1, 2010. The RECLAIM program includes facilities with NOx or SOx emissions greater than or equal to four tons per year in 1990 or any subsequent year. A wide range of equipment such as fluid catalytic cracking units, boilers, heaters, furnaces, ovens, kilns, coke calciner, internal combustion engines, and turbines are major sources of NOx or SOx emissions at the RECLAIM facilities. This control measure identifies a series of control approaches that can be implemented to further reduce NOx emissions at the RECLAIM facilities.

Background

The RECLAIM program was first adopted in 1993 to further reduce emissions from the largest NOx and SOx emitting stationary sources by providing an alternative regulatory mechanism to the command and control regulatory structure. Under this program, facilities are issued NOx and SOx allocations, also known as RECLAIM Trading Credits (RTCs) or facility emission caps, which are declined annually. To meet the declining annual facility

caps, RECLAIM facilities have the option of installing pollution control equipment, changing operations, or purchasing RTCs in the RECLAIM market.

The RECLAIM program is subject to several legal mandates. The Health and Safety code requires the District to monitor the advancement in Best Available Control Retrofit Technology (BARCT), and if BARCT advances, the District is required to periodically re-assess the overall facility caps, and reduce the RTC holdings, as if the equipment located at the facilities would be subject to applicable equivalent command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the basin attain the National Ambient Air Quality Standards (NAAQS) for ozone and $PM_{2.5}$ as expeditiously as practicable. The BARCT evaluation must include an evaluation of the maximum degree of reduction achievable with advanced control technologies taking into account the environmental, energy, and economic impacts for each class or category of source.

A review of the emissions profile of the RECLAIM universe shows that the NOx emissions are not evenly distributed among the RECLAIM facilities: the top 10% of the universe (24 facilities) comprised mainly of refineries, power plants, cement, glass, and steel manufacturing, emitted about 80% of the NOx emissions.

Regulatory History

On October 15, 1993, the AQMD's Governing Board adopted Regulation XX – RECLAIM. The RECLAIM program at its inception included 392 NOx facilities. RECLAIM Regulation XX includes 11 rules that specify the applicability, definitions, allocations, trading and operational requirements, as well as monitoring, reporting, and recordkeeping requirements. The NOx RECLAIM regulation has been revised several times, and one significant amendment (2005) reflected a BARCT re-assessment. The January 2005 amendment resulted in a NOx RTC reduction of 7.7 tons per day (tpd), approximately 22.5% reduction of the RTC holdings, which was implemented in 5 phases: 4 tpd by 2007 and an additional 0.925 tpd in each of the following 4 years.

PROPOSED METHOD OF CONTROL

Phase II of reductions will focus on periodic BARCT evaluation as required under the state law. A review of recently adopted control measures and air regulations in other air pollution control districts, as well as command-and-control rules adopted for non-RECLAIM facilities in the District, show that advancements in control technologies are available and can be applied to the top emitting sources. Such control technologies include but are not limited to selective catalytic reduction, low NOx burners, NOx reducing catalysts, oxy-fuel furnaces, and non-selective catalytic reduction. Several BARCT levels assessed at the inception of the program in 1993 for top emitting sources such as cement kilns, glass furnaces, and gas turbines were not subject to reduction in the 2005 RECLAIM rule amendment. These sources will be examined for further reductions in this control measure and potential rule making.

During the rulemaking process, staff may also incorporate the concepts of facility modernization, as well as include other feasible control measures such as increased energy efficiency and zero and near-zero emission technologies.

EMISSIONS REDUCTION

Staff's initial analysis shows that approximately 1-2 tpd additional NOx RTC reductions are feasible for the second phase from the RECLAIM universe (from the overall 3-5 tpd NOx RTC reductions discussed in the first phase). During the rule development phase, staff may refine the emission reductions to include growth and other unforeseen issues at this stage. Phase II will be incorporated into the 2015 AQMP for implementation by 2020 using the BARCT analysis that is developed in 2013 and 2014. It should be noted that since there are substantial NOx reductions needed by 2023, if additional reductions are feasible and cost effective, they will be evaluated during rulemaking. Note that the California Health and Safety Code requires the District to monitor the advancement in Best Available Control Retrofit Technology (BARCT), and if BARCT advances, the District is required to periodically re-assess the overall facility caps, and reduce the RTC holdings to applicable equivalent command-and-control BARCT levels.

According to the RECLAIM Annual Audit Reports, NOx emissions were reduced from 2008 to 2010, and the vast majority of the RECLAIM facilities complied with their RTC allocations. The audited annual NOx emissions for the entire RECLAIM universe were reported as 22.9, 20, and 19.5 tpd for compliance year 2008, 2009, and 2010, respectively. The NOx RTCs allocated for the universe were reported as 29.4, 28.4, and 27.5 tpd for compliance year 2008, 2009, and 2010, respectively. Data in the audit reports reflected an excess of 6.5, 8.4, and 8.0 tpd of RTCs holdings for compliance year 2008, 2009, and 2010, respectively, or approximately a 22–30% excess in RTC holdings in the most recent three years. Being cognizant that the 2008 emission profile may reflect a period of the economic downturn, staff's estimated target of a 3-5 tpd RTC allocation reduction (approximately 38 - 63 percent of the unused RTC holdings) for both phases combined appears to be achievable.

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

It is expected that the cost effectiveness for this control measure would be in the neighborhood of $16,000 per ton NOx reduced. It is based on the cost effectiveness developed for non-RECLAIM facilities or other command-and-control rules in other air pollution control districts. It should be noted that since RECLAIM facilities have the ability to trade RTCs, it tends to lower the actual cost of compliance. Staff will refine the cost effectiveness during the rule development phase.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from RECLAIM facilities.

REFERENCES

AQMD, 2008. Rule 1146 – Emissions of Oxides of Nitrogen from Industrial and Commercial Boilers, Steam Generators, and Process Heaters, Amended September 5, 2008.

AQMD, 2010. Rule 1110.2 – Emission Reductions from Gaseous and Liquid Fueled Engines, Amended July 9, 2010.

AQMD, 2010-12. Annual RECLAIM Audit Report for 2008 Compliance Year, March 5, 2010; Annual RECLAIM Audit Report for 2009 Compliance Year, March 5, 2010; and Annual RECLAIM Audit Report for 2010 Compliance Year, March 2, 2012.

AQMD, 2012. Stationary Source Committee, Item #4, Twelve-month Rolling Price of 2010 and 2011 Compliance Years RTCs, April 20, 2012

Bay Area, 2006. Regulation 9, Rule 9 – NOx from Stationary Gas Turbines, Amended December 6, 2006.

EPA, Menu of Control Measures - Control Options for Reducing NOx from Point and Area Sources, September 3, 2010.

EPA, Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Petroleum Refining Industry, October 2010.

LBL, 2005. Energy Efficiency Improvement and Cost Saving Opportunities for Petroleum Refineries, Sponsored by the U.S. EPA, Ernest Orlando Lawrence Berkeley National Lab, February 2005.

SJVUAPCD, 2007. Rule 4703 – Stationary Gas Turbines, Amended September 20, 2007.

SJVUAPCD, 2008. Rule 4320 – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater Than 5 MMBTU/hr, Adopted October 16, 2008.

SJVUAPCD, 2011. Rule 4354 – Glass Melting Furnaces, Amended May 19, 2011.

SJVUAPCD, 2011. Rule 4702 – Internal Combustion Engines, Amended August 18, 2011.

CMB-02: NOX REDUCTIONS FROM BIOGAS FLARES [NOX]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	LANDFILLS AND DIGESTERS			
CONTROL METHODS:	NOX REDUCTIONS FROM BIOGAS FLARES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2008**	**2014**	**2019**	**2023**
NOX INVENTORY	PENDING	PENDING	PENDING	PENDING
NOX REDUCTION			PENDING	PENDING
NOX REMAINING			PENDING	PENDING
CONTROL COST:	$20,000 PER TON NOX REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

** Pending because emission reductions will be provided prior to the Final.*

DESCRIPTION OF SOURCE CATEGORY

Background

Only hydrocarbon and toxic air contaminant emissions from landfills and waste treatment plants are regulated by AQMD rules 1150.1, 1150.2 and 1179. There are no source specific rules regulating NOx emissions from biogas flares. Flare NOx emissions are regulated through new source review and BACT. A survey of permits for landfill and waste treatment plant flares indicates NOx emissions range from 0.12 to 0.025 pound per million BTU of biogas (BACT since 2006) depending on the age of the flare. This control measure proposes that, consistent with the all feasible control measures, all biogas and non-refinery flares meet current BACT and/or implement flaring minimizations strategies.

Regulatory History

There are no source specific rules regulating NOx emissions from biogas flares.

PROPOSED METHOD OF CONTROL

This control measure proposes that, consistent with the all feasible measures control measure, all biogas and non-refinery flares meet current BACT. Most stringent current BACT (since 2006) for biogas flares is 0.025 pound of NOx per million BTU of biogas. As an alternative control option, staff will also explore opportunities to minimize flaring at landfills and waste water treatment and other non-refinery facilities.

EMISSIONS REDUCTION

Based on facility reported emissions (2010), the annual average emissions for biogas flares are about 0.1 tons per day of NOx. The average emission factor for biogas flares at facilities in the AQMD is 0.056 pounds per million BTU (unweighted average). However, the most stringent current BACT for biogas flares would generate NOx emissions is 0.025 pound per million BTU of biogas. Emissions vary by season and are affected by other operations at landfills and treatment plants. Staff estimates an average emission reduction of about 50% is achievable if all flares meet the most stringent current BACT limit of 0.025 pound NOx per million BTU of biogas.

RULE COMPLIANCE AND TEST METHODS

SCAQMD Method 100.1

COST EFFECTIVENESS

Based on cost information used for the 2006 AQMD BACT determination for biogas flares, the average cost effectiveness for meeting an emission limit of 0.025 pound per million BTU of biogas is less than $20,000 per ton of NOx reduced.

IMPLEMENTING AGENCY

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

REFERENCES

CMB-03: REDUCTIONS FROM COMMERCIAL SPACE HEATING [NOX]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	COMMERCIAL SPACE HEATERS			
CONTROL METHODS:	NOX EMISSION REDUCTIONS FROM COMMERCIAL SPACE HEATING			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023 (2023-2007 SIP)****
NOX INVENTORY	2.2	2.2	2.2	2.2 (0.7)
NOX REDUCTION		0	0.06*	0.18* (0.1)
NOX REMAINING		2.2	2.2	2.02 (0.6)
CONTROL COST:	$20,000 PER TON NOX REDUCED (0.6 TPD)			
IMPLEMENTING AGENCY:	SCAQMD			

***** Partial Implementation (starting in 2018 with full implementation over 20 years)

** Emission reductions provided are based on the 2012 AQMP emissions inventory. Values provide in parenthesis are based on the 2007 SIP inventory projections for 2023.

DESCRIPTION OF SOURCE CATEGORY

Background

Currently the AQMD regulates boilers and small residential and commercial central furnaces used for space heating. Boilers, depending on size, are subject to Rule 1146, 1146.1 or 1146.2. Residential and small commercial fan-type central furnaces are regulated by AQMD Rule 1111. Large commercial furnaces are not currently regulated by the AQMD unless they have a heat input rating of more than 2 million BTU per hour. Units with a rating of more than 2 million BTU per hour require an AQMD permit and are subject to a NOx BACT limit of 30 ppm (at a reference level of 3% oxygen). This control measure seeks emission reductions from unregulated commercial fan-type central furnaces used for space heating. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial fan-type central furnaces used for space heating.

Regulatory History

Large commercial furnaces are not currently regulated by the AQMD unless they have a heat input rating of more than 2 million BTU per hour. Units with a rating of more than 2 million BTU per hour require an AQMD permit and are subject to new source review and a NOx BACT limit of 30 ppm (at a reference level of 3% oxygen).

PROPOSED METHOD OF CONTROL

This control measure seeks NOx emission reductions of about 0.12 tpd by 2023 and ultimately at least 0.6 tons/day from unregulated commercial fan-type central furnaces used for space heating. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial fan-type central furnaces used for space heating.

The technology to reduce emissions from commercial space heating equipment is transferrable from residential space heating furnaces and other heating and drying equipment. Currently commercial space heaters are unregulated and have NOx emissions in the range of 90 to 110 ppm. The AQMD has required residential space heaters to meet a limit of 40 ng/J of heat output (55 ppm) since 1984 and the future limit, starting in 2014, for residential space heaters is 14 ng/J (20 ppm). Low NOx burners are also available for a variety of commercial and industrial heating and drying applications and achieve NOx emission levels of 10 to 30 ppm. Assuming a future NOx emission limit of between 20 ppm to 30 ppm, emissions from a commercial heating unit can be reduced by 60 to 80%. This measure will be implemented in two phases, beginning with a technical assessment to be completed by 2014 and Phase II rule development by 2016.

EMISSIONS REDUCTION

The commercial space heating inventory must be refined in order to identify the amount of natural gas used by fan-type space heaters versus hydronic (boiler-based) space heating. However, based on national estimates of floor space for different types of buildings and uses, staff estimates that 45 to 60% of all commercial, light manufacturing, warehouse, office, school and government building floorspace is heated by commercial forced air units. Assuming an emission reduction of between 60 to 80% and a 2008 baseline commercial heating inventory of 2.2 tons of NOx per day (uncontrolled), the measure would reduce NOx emissions by between 0.6 tons per day (2.2 tons/day X 45% of floor space X 60% reduction) and 1 ton per day (2.2 tons/day X 0.6 X 0.80). Growth and energy efficiency programs will affect the anticipated reduction from this control measure. Energy efficiency programs will reduce the benefit of this control measure, but together they will result in greater reductions from this source category.

RULE COMPLIANCE AND TEST METHODS

SCAQMD Method 100.1

COST EFFECTIVENESS

Based on the cost effectiveness of rules for other heating equipment (Rules 1111, 1121, 1146.2 and 1147), staff estimates the cost effectiveness at $20,000 per ton.

IMPLEMENTING AGENCY

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

REFERENCES

U.S. Department of Energy (April 2012). INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2010, Table 3.2.2 – Principal Commercial Building Types, as of 2003 (Percent of Total Floorspace)

FUG-01: VOC REDUCTIONS FROM VACUUM TRUCKS [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	VOC EMISSIONS FROM VACUUM TRUCKS			
CONTROL METHODS:	VOC CONTROL DEVICES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
VOC INVENTORY	1.50	1.50	1.50	1.50
VOC REDUCTION			1.05	1.05
VOC REMAINING			0.45	0.45
CONTROL COST:	$3,000 PER TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

DESCRIPTION OF SOURCE CATEGORY

This control measure addresses the attainment of emission reductions from vacuum trucks through the use of traditional control devices and technologies, including carbon adsorption systems, positive displacement pumps, internal combustion engines, thermal oxidizers, refrigerated condensers and liquid scrubbers.

Background

Vacuum truck services are used by a variety of industries, including petroleum refineries, marine terminals, industrial wharfs, gasoline dispensing facilities, gasoline bulk terminals, gasoline bulk plants, gasoline cargo tanks, gas well and oil well fields and pipelines. In the petroleum industry they are used to remove materials from storage tanks, vessels, sumps, boxes and pipelines. They are also used to transport materials from one location to another. The applicability of this control measure will be further studied during rule development taking into consideration the control availability and costs.

Regulatory History

Currently Vacuum Truck emissions are only controlled by Rule 1149, Storage Tank and Pipeline Cleaning and Degassing, when used as part of tank or pipeline degassing control devices. In refineries, the same vacuum trucks are used to remove hydrocarbon liquids from various types of equipment and are currently uncontrolled in these areas.

PROPOSED METHOD OF CONTROL

This measure will primarily focus on high-emitting vacuum truck operations, such as those found in petro-chemical industries, and other operations that include the transfer of volatile liquids, such as gasoline. There are a variety of technologies that are available to limit organic emissions from vacuum truck operations. Most of them can achieve capture and control efficiencies of 95%. Technologies include carbon adsorption systems, internal combustion engines, thermal oxidizers, refrigerated condensers, liquid scrubbers and positive displacement (PD) pumps. Sometimes control technologies can be combined. For example, an internal combustion engine can be combined with a chiller, or carbon adsorption can be combined with a scrubber. While some controls can be integrated into vacuum trucks, most vacuum trucks are not commonly equipped with on-board control equipment. However, vacuum truck operations do use outboard carbon adsorption systems, thermal oxidation, or internal combustion engine technologies. Such control technologies are typically connected as a "skid-mount" or "portable trailer unit." Control equipment has generally been used for safety reasons, to control odors, or to comply with requirements in the Code of Federal Regulations.

EMISSIONS REDUCTION

Organic emissions from affected vacuum truck operations are estimated at 1.50 tpd. These emission estimates include throughput that is already controlled or minimized through use of external abatement equipment, positive displacement pumps, or gravity feed. Based on studies done in the Bay Area at similar facilities, staff estimates that 50% of vacuum truck operations can be controlled with external control equipment such as carbon adsorption or thermal oxidization. These devices have an efficiency of at least 95%. The other half of affected vacuum truck operations can be minimized by the use of positive displacement pumps or gravity feed. For these operations, staff estimates control efficiency of 75%. VOC emission reductions are estimated to be approximately 1.05 tpd, which represents an 85% reduction in emissions from regulated materials and staff estimates a 70% reduction potential of overall organic emissions from vacuum truck operations along with a high concurrent reductions in toxic air contaminants such as benzene, toluene, xylene, hexane, and possibly greenhouse gas emissions.

RULE COMPLIANCE AND TEST METHODS

Compliance would be based on field inspection and possible recordkeeping requirements that will be established in a rule or regulation requiring control technology installation and usage.

COST EFFECTIVENESS

The proposed controls would be structured to focus on cost effectiveness. Highly volatile liquids, such as gasoline, emit high rates of organic emissions when moved into vacuum trucks. However, source testing has found that many materials moved by vacuum trucks in petroleum refineries, such as wastewater, emit at a very low rate and are thus not cost effective to control. Therefore, only those materials that source tests have shown to have high emissions and that are cost-effective to control would be likely included in the scope of this effort.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from non-vehicular sources. The proposed control measure targets equipment that is not part of the propulsion engine.

REFERENCES

Staff Report - Bay Area Air Quality Management District, Proposed Regulation 8, Rule 53: Vacuum Truck Operations, and Amendments to Regulation 2, Rule 1: Permits.

FUG-02: EMISSION REDUCTIONS FROM LPG TRANSFER AND DISPENSING [VOC]

CONTROL MEASURE SUMMARY					
SOURCE CATEGORY:	LPG TRANSFER AND DISPENSING				
CONTROL METHODS:	PHASE I: RETROFITTING STATIONARY STORAGE TANKS AND CYLINDERS WITH LOW EMISSION FIXED LIQUID LEVEL GAUGES AND USE OF LPG LOW EMISSION CONNECTORS FOR TRANSFER AND DISPENSING *(Already adopted)* PHASE II: EXPAND RULE APPLICABILITY TO INCLUDE LPG TRANSFER AND DISPENSING AT OTHER FACILITIES, INCLUDING CURRENTLY EXEMPTED FACILITIES				
EMISSIONS (TONS/DAY):					
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023***
VOC INVENTORY	9.5	6.8	3.9	4.1
VOC REDUCTION			1 - 2	1 - 2
VOC REMAINING			1.9 - 2.9	2.1 - 3.1
CONTROL COST:	$4,000 - 10,000/TON VOC REDUCED				
IMPLEMENTING AGENCY:	SCAQMD				

* New emissions source category. No corresponding emissions in 2007 AQMP.

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce VOC emissions associated with the transfer and dispensing of Liquefied Petroleum Gas (LPG).

Background

In 1992, the California Air Resources Board (CARB) made the first attempt to quantify LPG transfer and dispensing emissions by conducting a study to determine the usage patterns of LPG and to estimate emissions resulting from these operations for the entire state of California. The study concluded that LPG fugitive emissions from transfer and dispensing operations result from three main areas: volatilization of entrapped product during disconnection of LPG supply and transfer lines, leaks in the equipment used for transfer and dispensing, and venting through

fixed liquid level gauges (FLLGs) used as a safety device to ensure that pressurized receiving containers, including cylinders and tanks are not overfilled.

Regulatory History

In August 2010 the District initiated rule development and adopted Rule 1177 on June 1, 2012, which required the use of low emission FLLGs and LPG low emission connectors. Upon full implementation in July 2017, Rule 1177 will achieve 6.1 tpd VOC reductions from the estimated 8.6 tpd baseline inventory for the regulated facilities.

Rule 1177 evaluated fugitive VOC emissions from the venting of FLLGs during filling and from the disconnection of LPG supply and transfer lines to determine baseline VOC emissions and the associated reductions. However, although leaks in the equipment used for transfer and dispensing were not evaluated or quantified due to the lack of data, Rule 1177 will implement a Leak Detection and Repair (LDAR) program for transfer and dispensing facilities that offer LPG for sale to end users.

Currently, Rule 1177 includes an exemption for facilities that are subject to the requirements of Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants. These facilities include refineries, marine terminals, natural gas processing plants and pipeline transfer stations, as well as facilities that conduct fill-by-weight techniques.

PROPOSED METHOD OF CONTROL

The development and adoption of Rule 1177 constitutes Phase I of this control measure. Under Phase II, the proposed control measure will expand the applicability of Rule 1177 to include VOC emissions associated with LPG transfer and dispensing activities at previously exempted facilities and evaluate the potential for further reductions in VOC emissions.

EMISSIONS REDUCTION

The emission reductions from Phase II of the control measure are anticipated to be 1 – 2 tpd in addition to the 6.1 tpd achieved under Phase I adopted June 2012.

RULE COMPLIANCE

Compliance with the provisions of this control measure would be based on monitoring, vapor collection, and inspection requirements. In addition, compliance will be verified through recordkeeping and reporting that will be used to track requirements.

COST EFFECTIVENESS

For Phase 1 of this control measure, the cost-effectiveness is estimated to be approximately $1,700 per ton of VOC emissions reduction. Staff will continue to evaluate technology and

costs associated with the broadened applicability and estimate a cost-effectiveness of between $4,000 and $10,000 per ton of VOC emissions.

IMPLEMENTING AGENCY

The District has authority to adopt and enforce rules and regulations applicable to non-vehicular sources. The control measure will not affect propulsion engines (Health and Safety Code, Section 40001).

REFERENCES

South Coast Air Quality Management District, "Draft Staff Report For Proposed Rule 1177 – Liquefied Petroleum Gas Transfer and Dispensing," May, 2012.

Life Cycle Associates, LLC (2011), "Inventory of Fugitive Emissions from LPG Transfers in California, prepared for Western Propane Gas Association," June 2011 (CONFIDENTIAL).

CARB (1992) "Determination of Usage Patterns and Emissions for Propane /LPG in California," May 1992.

FUG-03: FURTHER REDUCTIONS OF FUGITIVE VOC EMISSIONS [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	FUGITIVE EMISSIONS SOURCES			
CONTROL METHODS:	IMPROVED/EXPANDED LEAK DETECTION PROGRAMS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023 (2023-2007 SIP)***
VOC INVENTORY	3.8	3.8	3.8	3.8 (1.6)
VOC REDUCTION			1 - 2	1 -2 (0.4 - 0.8)
VOC REMAINING			1.8 - 2.8	1.8 - 2.8 (0.8 - 1.2)
CONTROL COST:	$11,000/TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

* Emission reductions provided are based on the 2012 AQMP emissions inventory. Values provide in parenthesis are based on the 2007 SIP inventory projections for 2023.

DESCRIPTION OF SOURCE CATEGORY

This control measure 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. Most of these facilities are required under District and federal rules to maintain Inspection/Maintenance or leak detection and repair (LDAR) programs that involve individual screening of all of their piping components.

The scope of this control measure is to enhance the effectiveness of existing Inspection/Maintenance and LDAR programs that identify and repair leaks from equipment components by upgrading Inspection/maintenance programs to LDAR and enhancing current LDAR Programs, where feasible. This control measure will apply LDAR programs to areas currently not covered by existing rules such as harbor vessels and oil drilling operations. For this purpose, the proposed control measure relies on recently developed technology, called optical gas imaging, to detect leaks. 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 on 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, which is 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 range from a simple inspection/maintenance program, to self-inspection programs or an LDAR program. The following rules address fugitive emissions in this manner: Rules 462 – Organic Liquid Loading, 463 – Storage of Organic Liquids, 1142 – Marine Vessel Tank Operations, 1148.1 Oil Well Enhanced Drilling, 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

There are numerous EPA air pollution standards as well as AQMD Rules that require specific work practices for equipment leak detection and repair (LDAR). The current work practice requires the use of a monitor which meets required performance specifications. This work practice is based on 25-year-old technology. While such work practices have been extremely successful in reducing fugitive emissions, recent developments in optical gas imaging provide opportunities for further improvements.

This control measure will pursue two goals: First, as described below, to upgrade inspection/ maintenance rules to at least a self-inspection program, or to an optical gas imaging-assisted LDAR program where feasible. Second, to explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs in achieving additional emission reductions.

Rule 462 – Organic Liquid Loading, Rule 1142 - Marine Vessel Tank Operations and Rule - 1148.1 Oil Well Enhanced Drilling are rules that require owner/operators to inspect and to repair and maintain equipment in good operating order when the equipment is operating. Under this control measure, the work practices for these rules would be upgraded to a self-inspection program that requires repairs and maintenance to be documented with records and, where

appropriate, reported. Some of these same programs could be enhanced by adding some of if not all of the requirements of an LDAR program.

Rule 463 - Storage of Organic Liquids and 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities are two rules that utilize a self-inspection program. Rules 1173 - Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum and Chemical Plants and Rule 1176 - Sumps and Wastewater Separators incorporate an LDAR program. Under this control measure, these rules would be candidates for further improvements in current work practices through the use of new detection technology.

For new detection technology this control measure will be implemented in two phases: Phase I will be a pilot LDAR program to demonstrate feasibility with the new technology and to establish implementation protocols. The completion of phase I will result in the identification of facilities/industries currently subject to LDAR programs and identification of those where the new technology is not yet ready to be utilized. Based on the results of Phase I, fugitive VOC rules will be amended as appropriate under the subsequent phase (Phase II) to enhance their applicability and effectiveness, and to further achieve emissions reductions.

EMISSIONS REDUCTION

The emission reductions from this control measure have not been determined. However, implementing an LDAR program to source categories that are currently not subject to such programs and/or augmenting current and new LDAR programs with the optical gas imaging capabilities would further reduce fugitive emissions by improving operators' ability to detect leaking components and accelerate repairs. Emission reductions are estimated at 1 – 2 tons per day.

RULE COMPLIANCE

Rule compliance would be similar to compliance requirements under existing Rules 462, 463, 1142, 1148.1 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

Emission reductions associated with this control measure has been determined to be approximately $11,000 per ton VOC reduced.

IMPLEMENTING AGENCY

The District has authority to regulate fugitive VOC emissions sources from non-vehicular 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.

MCS-01: APPLICATION OF ALL FEASIBLE MEASURES ASSESSMENT [ALL POLLUTANTS]

As this measure is a continued implementation from the short-term PM2.5 measures, the reader is referred back to MCS-01 in Section 2 of this appendix.

MCS-02: FURTHER EMISSION REDUCTIONS FROM GREENWASTE PROCESSING (CHIPPING AND GRINDING OPERATIONS NOT ASSOCIATED WITH COMPOSTING)
[VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	GREENWASTE MATERIAL HANDLING OPERATIONS			
CONTROL METHODS:	ALL FEASIBLE MITIGATION MEASURES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2008**	**2014**	**2019**	**2023**
VOC INVENTORY*	1.67	1.67	1.67	1.67
VOC REDUCTION		1.0 - 1.34	1.0 - 1.34	1.0 - 1.34
VOC REMAINING		0.33 - 0.67	0.33 - 0.67	0.33 - 0.67
CONTROL COST:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

** Preliminary estimates only – not in current inventory, therefore reductions are not included in the SIP commitment.*

DESCRIPTION OF SOURCE CATEGORY

Chipping and grinding is a process to mechanically reduce the size of greenwaste and woodwaste materials. Chipped or ground greenwaste can be utilized in related operations as feedstock for composting, bulking agent for co-composting, land-application for erosion control or soil reclamation, or alternative daily cover at landfills.

Background

California Integrated Waste Management Act of 1989 (AB 939) established a new direction for waste management in the state of California and set up a new mandate for local jurisdiction to meet diversion goals to conserve resources and extend landfill capacity. AB 939 mandated local jurisdictions to meet solid waste diversion goal of 25% by 1995 and 50% by 2000. California's statewide estimated diversion rate has been steadily increased and the rate for 2006 is 54%, 2% points higher than the 2005 estimate. Compostable organic materials comprise of approximately 25% of California's waste stream. Compostable material handling operations are currently regulated by CalRecycle in accordance with the California Code of Regulations, Title 14, Division 7, Chapter 3.1 that was promulgated in 2003. In 2007, the former California Integrated Waste Management Board (currently CalRecycle) adopted Strategic Directive 6.1, which in addition to the diversion goals outlined in AB 939, seeks an additional 50% diversion of organics from landfills, thereby increasing diversion from 50 to 75%, by 2020 in support of the California Global Warming Solutions Act of 2006. Along with the adoption of SB 1016 in 2008, the 50% diversion rate is now measured in terms of per-capita disposal expressed as pounds of solid waste disposed per person per day, to help determine each jurisdiction's progress toward achieving AB 939 diversion goals. Cities and local jurisdictions are also

seeking to improve on diversion efforts through alternative uses for foodwaste, either from unused food at restaurants or expired grocery store food products. Efforts also include limited residential foodwaste pilot programs. There has been some success in California relative to foodwaste composting and future statewide requirements are possible.

District rules currently establish Best Management Practices (BMPs) for greenwaste composting and related operations under Rule 1133.1 – Chipping and Grinding Activities, and Rule 1133.3 – Greenwaste Composting Operations. Rule 1133.1 established maximum stockpile holding times at chipping and grinding facilities consistent with the greenwaste material processing requirements in the Title 14, Division 7, Chapter 3.1, Section 17852 (a)(10)(A)(2) of the California Code of Regulations (CCR). Rule 1133.3 established BMPs and VOC emissions reduction requirements for greenwaste composting operations that process greenwaste only or a greenwaste mixture with manure or foodwaste. During rule development, stakeholders suggested the need to develop a more holistic approach, identifying and accounting for emissions from all greenwaste streams, and reducing potential emissions from greenwaste material handling operations at chipping and grinding facilities and other related facilities, not just those associated with composting operations.

Greenwaste material generated from commercial and non-commercial properties are typically transported to material recovery facilities (MRFs), transfer stations, or processing (i.e., chipping and grinding) facilities. Processed greenwaste is further utilized as feedstock for composting, used as fuel, used as an alternative daily cover at landfills, or directly applied to land for erosion control or soil reclamation. However, it is also possible that processed or unprocessed greenwaste is stockpiled for long periods of time without appropriate handling. It is possible that some processed greenwaste may be directly applied to land without a specific purpose, or even illegally dumped. In either case, unwanted VOC emissions may occur from the greenwaste piles. There is currently a lack of information on the greenwaste streams that are generated, processed, and utilized or disposed of in the District.

Regulatory History

Currently, there are approximately 70 chipping and grinding facilities in the District's jurisdiction that are covered by Rule 1133.1. These chipping and grinding facilities are required to remove stockpile from the site within 48 hours of receipt to conform to the state green material holding time requirements. San Joaquin Valley APCD developed daily VOC emission factors for greenwaste stockpile during their organic waste composting rule development process.

There is a lack of data on VOC emissions from chipping and/or grinding itself, not associated with composting operations, as well as from chipped or ground greenwaste. The existing database of chip and grind operations does not necessarily include landscape and tree trimming operations that use chippers to reduce trimmings for transport. Some operations hold materials for 4 to 7 days prior to actual disposal and it is unknown what the end use of the material is. Such operations are not necessarily in the CalRecycle database or regulated by the local enforcement agency. Key to this measure is to determining where all green material comes from and what is its end use, if not for composting, and at what point is the material most emissive, whereby control strategies can be focused. End uses include dumping and spreading material on open land, landfill disposal for daily cover, drying chips for ground cover (such as

freeway interchanges), and taking the material through the pathogen reductions process and selling as a soil amendment.

PROPOSED METHOD OF CONTROL

The greenwaste streams in the District would need to be re-evaluated in order to better understand the greenwaste material handling operations including generation processing, and final destination. This control measure would seek to establish additional BMPs for handling processed or unprocessed greenwaste material by processors, haulers, and operators who handle or stockpile material or directly apply the material to land.

According to a study of biogenic VOC emissions from leaf mulch, VOC emissions peak immediately after leaves were mulched. The emission rates declined with time after chipping and ceased after approximately 30 hours. Another study found that wounded plants have the potential to produce and emit VOCs as a wound defense mechanism. In the latter study, emissions of wound-induced VOCs occurred immediately following excising the leaf, were dependent on the degree of wounding, and were oxygen-dependent. Drying of a cut leaf also resulted in the formation of wound-induced VOCs. Such VOC emissions from chipped greenwaste are likely to be associated with the biological mechanisms of the plant's response to mechanical trauma, rather than with microbial consumption of nutrients. The biological mechanisms driving these emissions are only partially understood.

Based on these initial findings, the following control methods would be proposed.

- Cover chipped or ground greenwaste material as early as operationally possible after chipping and grinding. An impermeable tarp may be considered as a cover material. Finished compost or compost overs would be a good cover material because of a VOC adsorption effect; however, finished compost or compost overs would not be readily available at chipping and grinding facilities, but also may deteriorate the qualitative value of chipped or ground greenwaste material for further use (compost overs are defined as the oversized woody materials that do not decompose in a typical composting cycle and are screened out of finished product at the end of composting).
- Chipped or ground greenwaste material would remain covered until it is removed from the site within 48 hours, as required in the current stockpile holding time requirement pursuant to Rule 1133.1. The cover duration may be adjusted to 12 hours or 24 hours after chipping or grinding since the VOC emissions are short-lived and the emission rates decrease exponentially with time.
- Seasonal covering of the chipped or ground greenwaste material may also be considered for the summer months when ozone and secondary particulate formation potential is greatest.
- In addition, greenwaste material streams need to be understood from generation to destination. Actual throughput of the processed and produced feedstock would be better understood by strengthening the requirements of reporting in Rule 1133 Registration/Annual Update and the requirements of Rule 1133.1 Recordkeeping. Updated feedstock inventory would be used to refine emissions and reduction potentials, as well as to develop cost-effective BMPs or controls.

There are some uncertainties for this proposed control measure. According to the above studies, VOC emissions occur immediately after branches and leaves are being cut. By the time cut greenwaste material arrives at a processing facility, VOCs from the first cutting may already have been released to the air. Although the study reported that the subsequent cutting of the cut leaf still emitted VOCs, it is uncertain how much VOCs would continue to be emitted from chipping and grinding of greenwaste upon receipt at the processing facility.

This proposed control measure would be implemented in two phases:

- Phase 1 – The existing database would be reviewed to refine the greenwaste material inventory, including the Rule 1133 Registration database and any study results on greenwaste processing infrastructure conducted by public or private entities, as available. Recent regulatory development activities by CalRecycle and other air districts, including San Joaquin Valley APCD, as applicable, would be reviewed to seek potential emission mitigation measures where feasible. Recent studies on emission factors and BMPs would also be reviewed to assess reduction potential. Emission source tests may be warranted to determine VOC emissions from processed greenwaste material. Staff will work with counties and cities relative to green material handling practices in light of the aforementioned state diversion requirements and goals in order to determine green material end use and minimize any potential adverse impacts associated with implementing this measure. A survey of greenwaste processors, haulers and operators may be implemented to better comprehend the greenwaste streams and utilization.
- Phase 2 – A rule would potentially be developed to incorporate technically feasible and cost-effective BMPs or controls. The District will convene its working group involving all stakeholders to develop cost-effective and workable solutions for this source category.

EMISSIONS REDUCTION

In review of research on emissions potential from greenwaste operations commissioned by San Joaquin Valley APCD, District staff derived an emission factor of 0.196 pounds of VOC per wet ton per day for greenwaste feedstock storage and processing. For 17,000 tons of maximum permitted greenwaste throughput per day that were preliminarily estimated from 55 chipping and grinding facilities in the CalRecycle's SWISS database (accessed in 2010), about 1.67 tons of VOCs per day are estimated to be emitted from greenwaste stockpile using the District staff's daily VOCs emission factor. Note that this emission factor was initially derived from greenwaste feedstock at varying ages before it was formed into a windrow at composting facilities. Actual VOC emission factors from chipped or ground greenwaste at a processing facility may be different. New source testing is possibly warranted to derive better emission factors. An updated and comprehensive emissions inventory and facility identification is also needed to better quantify potential emissions reductions.

According to Fedele et al.'s study, VOC concentrations decreased from about 37 ppmC at 1 hour after chipping leaves to 5 ppmC at 12 hours and to about 2 ppmC at 24–30 hours. The emissions reduction potential can be calculated at about 60-80% control with proposed covering of chipped or ground greenwaste.

RULE COMPLIANCE AND TEST METHODS

A District regulation or other enforceable instrument will be considered to ensure emission reductions. The most effective regulatory tool will be selected based on the BMP options. Implementation of this control measure will not conflict with efforts under AB939. District staff will work with CalRecycle to develop appropriate test methods, based on BMPs.

COST EFFECTIVENESS

Cost-effectiveness for BMPs or controls will be determined during rule development process based on findings from Phase I.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from non-vehicular sources.

REFERENCES

Final Staff Report for Proposed Amended Rule 1133.1 and Proposed Rule 1133.3, AQMD, July 2011.

Compost VOC Emission Factors, SJVUAPCD, September 15, 2010.

Fedele, R., Galbally, I.E., Porter, N., Weeks, I.A., 2007, Biogenic VOC emissions from fresh leaf mulch and wood chips of *Grevillea robusta* (Australian Silky Oak), Atmospheric Environment 41, 8736–8746.

Ray, F., Karl, T., Hansel, A., Jordan, A., Lindinger, W., 1999, Volatile organic compounds emitted after leaf wounding: On-line analysis by proton-transfer-reaction mass spectrometry, Journal of Geophysical Research 104 (D13), 15963–15974.

MCS-03: IMPROVED START-UP, SHUTDOWN AND TURNAROUND PROCEDURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ALL SOURCE CATEGORIES			
CONTROL METHODS:	OPERATIONAL PROCEDURES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2008**	**2014**	**2019**	**2023**
POLLUTANT INVENTORY	TBD	TBD	TBD	TBD
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
CONTROL COST:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

* TBD are reductions to be determined once the inventory and control approach are identified.

DESCRIPTION OF SOURCE CATEGORY

This control measure is carried over from the 2007 AQMP/SIP.

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 is 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 with which particular equipment is fired to reach normal operating conditions or is taken out of service. Start-up, shutdown or turnaround often adversely impact the emission rates from pieces of equipment that are interconnected, either upstream or downstream, to the 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.

Regulatory History

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

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 are needed to achieve this purpose.

Several of these approaches are also applicable to other types of industries in minimizing emissions from 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

This measure will be implemented in two phases, beginning with a technical assessment to be completed in the 2012/2013 timeframe. Under Phase I, effort will include establishing procedures that better quantify emission impacts from start-up, shutdown or turnarounds. Under Phase II, analyses will be conducted to identify improved operating procedures that minimize emissions from such processes 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

The Phase I of the study may cost up to $300,000 and the cost of Phase II will be assessed based on findings from Phase I.

IMPLEMENTING AGENCY

The District has authority to regulate non-vehicular sources, including 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

INC-01: ECONOMIC INCENTIVE PROGRAMS TO ADOPT ZERO AND NEAR-ZERO TECHNOLOGIES [NOx]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ALL COMBUSTION CATEGORIES			
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2008**	**2014**	**2019**	**2023**
NOx INVENTORY	TBD	TBD	TBD	TBD
NOx REDUCTION		TBD	TBD	TBD
NOx REMAINING		TBD	TBD	TBD
CONTROL COST:	TBD			
IMPLEMENTING AGENCY:	SCAQMD			

* TBD are reductions to be determined once the inventory and control approach are identified.

DESCRIPTION OF SOURCE CATEGORY

There is a need for significant NOx reductions. The primary objective of this measure is to develop a program that promotes and encourages adoption and installation of cleaner, more efficient stationary combustion equipment with a focus on zero and near-zero emission technologies, such as boilers, ovens, furnaces, internal combustion engines, water heaters and commercial space heating, through economic incentive programs subject to the availability of public funding. Currently, there are approximately 20,000 pieces of permitted combustion equipment within the South Coast Air Basin. Incentives may include grants for new purchases of equipment as well as loan programs in areas where long-term cost savings from increased efficiency can be achieved. Projects or programs that demonstrate emission reductions also serve to protect public health by reducing the public's exposure to air pollutants.

This control measure would provide funds to reduce emissions by encouraging energy efficiency improvements and expanding renewable energy sources, so as to potentially create and retain jobs, and promote economic growth and competitiveness.

Background

In the past, the SCAQMD has adopted a series of programs that incorporate a variety of different incentive approaches, such as emissions trading programs, mitigation fee programs, Air Quality Investment Program (AQIP), and averaging. These programs were developed to promote the commercialization of advanced pollution control technologies while encouraging economic growth and providing compliance flexibility.

The District continues to implement incentive programs to help promote efficient clean equipment purchases, efficiency projects, and conservation techniques that provide toxic and criteria pollutant emissions benefits, as well as greenhouse gas emission reductions.

Currently, there are several existing incentive programs which help promote higher efficiency and lower emitting technologies such as: Coachella Valley Emission Reduction Projects; Lawn Mower and Leaf Blower Exchanges; SOON Program; Carl Moyer Memorial Air Quality Standards Attainment Program; MSRC & Area Source Credit Programs; and Voucher Incentive Program.

Regulatory History

AQMD offers a number of funding /grant resources to encourage the immediate use of commercially available, low-emission mobile and stationary technologies. The incentive programs, which include incremental funding or subsidies, are designed to promote voluntary introduction of new technologies on an accelerated schedule. These programs may also provide manufacturers with incentives to accelerate the deployment of the cleaner combustion technologies.

As this measure is not a regulatory item that will be implemented via rulemaking, there is no relevant regulatory history in this area. However, as mentioned above, the District has developed and implemented a wide array of incentive programs designed to achieve emission reductions on a voluntary basis.

PROPOSED METHOD OF CONTROL

This control measure is intended to result in the accelerated turnover of older high-polluting combustion equipment with newer, low-emission equipment providing real emission reductions above those that would otherwise occur through normal equipment turnover. This is a stationary source Moyer-type program in that the economic incentives provide additional funds for businesses to adopt cleaner, more efficient combustion equipment than currently required by the District and help meet 2023 and 2032 ozone standards.

The District in conjunction with other entities would fund cost effective projects that meet certain technical criteria in combination with implementing best management practices through various incentive programs and competitive grants. These funds would help accelerate turnover of older, energy inefficient and higher polluting equipment. The incentives would cover some or all of the cost difference associated with purchasing newer cleaner combustion equipment, add-on control equipment, and / or rebuilding the existing equipment. This could be of great benefit to companies that do not have the financial means to modernize their facilities to become more energy efficient and less polluting. Projects funded under this program must achieve emission reductions in excess of requirements under local, state or federal regulations.

Priority could be given to the projects that quality for the use of available funds that provide: Maximum environmental and energy co-benefits such as criteria and toxic pollutant reductions as well as greenhouse gas emission reductions; energy security and efficiency; advanced technology; and demonstrate local job creation.

EMISSIONS REDUCTION

Estimates for criteria pollutant emission reduction from these technologies can potentially result in 65 percent or greater reduction in emission from today's regulatory requirements. Implementation and evaluation of additional incentive programs will provide a means to quantify emission reduction benefits as they are developed. Emission reductions achieved from these activities will be in excess of reductions achieved by current regulatory programs and will be used for SIP purposes.

RULE COMPLIANCE AND TEST METHODS

Combustion equipment and control of combustion equipment require a permit under existing District rules and regulations. Making a modification with the combustion equipment or control of emissions will require a permit modification or surrender of existing permit ensuring the cleaner equipment remains in the jurisdiction, along with the emission benefits. If there are any remaining combustion emissions, the permit conditions would ensure its limitation and compliance.

COST EFFECTIVENESS

The cost effectiveness of this measure cannot yet be determined, given the variety of incentive programs and projects that will be developed. The District will continually analyze costs associated with incentive programs and, where possible, quantify resulting emissions reductions. The cost effectiveness for specific incentive programs can be determined as they are developed and implemented by the District.

IMPLEMENTING AGENCY

The District in cooperation with other local governments, agencies, technology manufacturers and distributors will seek funding sources and provide incentives to encourage adoption of cleaner, more efficient combustion equipment.

REFERENCES

South Coast Air Quality Management District, "Surplus Off-Road Opt-In for NOx (SOON) Program," (http://www.aqmd.gov/tao/Implementation/SOONProgram.htm), May 2012.

California Air Resources Board. "The Carl Moyer Program Guidelines", March 2012.

South Coast Air Quality Management District, "Coachella Valley Emission Reduction Projects," (http://www.aqmd.gov/prdas/CVRFP-AB1318/Coachella.htm), February 2012.

South Coast Air Quality Management District, "Mobile Source Emission Reduction Credit (MSRC) and Area Source Credit (ASC) Programs," (http://www.aqmd.gov/tao/Implementation/mobile_source_emission_reduction.htm), November 2008.

South Coast Air Quality Management District, "Air Quality Investment Program - AQIP," (http://www.aqmd.gov/trans/aqip.html), June 2010.

South Coast Air Quality Management District, "Voucher Incentive Program," (http://www.aqmd.gov/tao/Implementation/VIP.htm), April 2012.

South Coast Air Quality Management District, "Lawn Mower and Leaf Blower Exchanges," (http://www.aqmd.gov/tao/lawnmower.html), April 2012.

INC-02: EXPEDITED PERMITTING AND CEQA PREPARATION FACILITATING THE MANUFACTURING OF ZERO AND NEAR-ZERO TECHNOLOGIES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ALL SOURCE CATEGORIES			
CONTROL METHODS:	VOLUNTARY INCENTIVES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2008**	**2014**	**2019**	**2023**
POLLUTANT INVENTORY	N/A	N/A	N/A	N/A
POLLUTANT REDUCTION		N/A	N/A	N/A
POLLUTANT REMAINING		N/A	N/A	N/A
CONTROL COST:	None			
IMPLEMENTING AGENCY:	SCAQMD			

** N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach, incentive programs.*

DESCRIPTION OF SOURCE CATEGORY

This proposed measure is aimed at providing incentives for companies to manufacture zero and near-zero emission technologies locally, thus populating the market, potentially lowering the purchase cost, increasing demand, and creating local manufacturing jobs. With availability and usage of such technologies, air quality benefits will be achieved. This proposed measure focuses on two elements: 1) process the required air permit(s) in an expedited procedure; and 2) facilitate the preparation of the applicable CEQA document. A stakeholder process will be initiated to design the program and leverage other existing SCAQMD or local programs.

Background

In the past, the SCAQMD has adopted a series of programs developed to promote the commercialization of advanced pollution control technologies while encouraging economic growth and providing compliance flexibility by offering expedited permitting and CEQA preparation. Such programs include "Green Carpet" Priority Permitting Service, Business Clean Air Partnership, Regulatory Reform Initiative, and Environmental Justice Enhancement III-2 ("Super Clean Air Actions"). The manufacturing and deployment of zero and near-zero emission technologies will help reduce criteria pollutant emissions in the region, accelerate removal of equipment that can last for many decades, and advance economic development and job opportunities in the region.

Regulatory History

The SCAQMD has permitting authority over stationary sources that emit air pollutants and the controls designed to limit air pollution. The process of obtaining an air quality permit includes a thorough review to ensure compliance with all applicable rules and regulations, such as source specific standards, new source review, air toxic risk, and best available control technology.

Under Title 14 of the California Code of Regulations, Chapter 3, Article 1, Section 15002(e), "a government agency is required to comply with California Environmental Quality Act (CEQA) procedures when the agency proposes to carry out or approve the activity." Further, under Section 15002(f), "CEQA applies in situations where a governmental agency can use its judgment in deciding whether and how to carry out or approve a project." As a discretionary authority to approving a project through the required air quality permit, the SCAQMD has a legal obligation to ensure compliance with CEQA requirements before issuing an air quality permit.

PROPOSED METHOD OF CONTROL

This measure would seek to promote zero and near-zero emission technologies by offering the incentive of an expedited permitting and assistance in CEQA document preparation for manufacturing or distribution of such technologies. By agreeing to manufacture and distribute zero and near-zero emission technologies, a proponent would be rewarded with a streamlined administrative review by the SCAQMD while providing significant emission reduction benefits to the region. The expedited permitting and review program would only accelerate the processing of applications, which would still need to comply with all applicable rules, regulations, and guidelines.

To implement this measure, a stakeholder working group will be established to discuss and propose program designs that will provide meaningful incentives to manufacturers of zero and near zero technologies to be sited locally.

Examples of zero and near-zero emission technologies will be further developed during program development. They include, but are not limited to, the manufacturing of fuel cells, electric batteries for any stationary or mobile applications, and other zero- and near-zero technologies.

Under this measure, the SCAQMD will also evaluate potential permit system modifications that would incentivize use of zero and near zero emission technologies, and would adopt such measures that are determined to be feasible.

EMISSIONS REDUCTION

Due to the voluntary nature of this control measure, potential emission reductions associated with the implementation of this control measure cannot be quantified. The benefit of this measure is to facilitate the deployment of zero and near zero technologies that are needed to achieve the air quality standards and to create local manufacturing jobs.

RULE COMPLIANCE AND TEST METHODS

Not applicable.

COST EFFECTIVENESS

Savings, since this is a voluntary incentive program.

IMPLEMENTING AGENCY

The District has the authority to provide incentives to encourage the manufacturing of zero and near-zero technologies, and to prioritize permit applications and review processes as needed.

REFERENCES

South Coast Air Quality Management District. "Environmental Justice Enhancement III-2 ("Super Clean Air Actions")." July 2003.

South Coast Air Quality Management District. "Green Carpet" Priority Permitting Service. April 1996.

South Coast Air Quality Management District. "Business Clean Air Partnership." April 1995.

South Coast Air Quality Management District. "Regulatory Reform Initiative." March 1996.

EDU-01: FURTHER CRITERIA POLLUTANT REDUCTIONS FROM EDUCATION, OUTREACH, AND INCENTIVES [ALL POLLUTANTS]

As this measure is a continued implementation from the short-term PM2.5 measures, the reader is referred back to EDU-01 in Section 2 of this appendix.